

CANADIAN MACHINERY AND MANUFACTURING NEWS

A weekly newspaper covering in a practical manner the mechanical power, foundry and allied fields.
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SKF

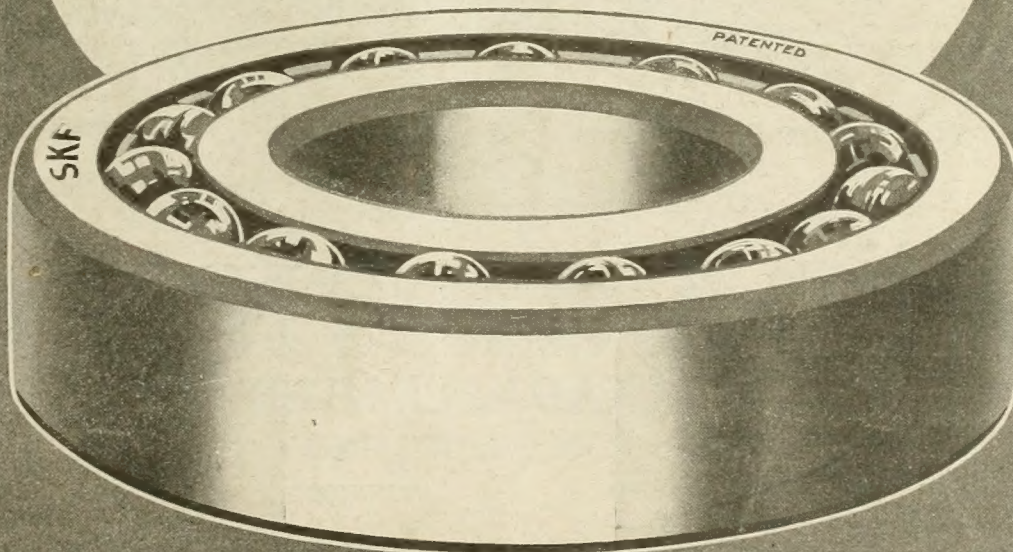
These letters are the hall mark of an engineering service and indicate accurate manufacture. When ball bearings are marked SKF they are known to be correctly designed and of the highest quality that modern science can produce.

Canadian **SKF** Company, Ltd.

TORONTO, Ont.
47 King Street West

318

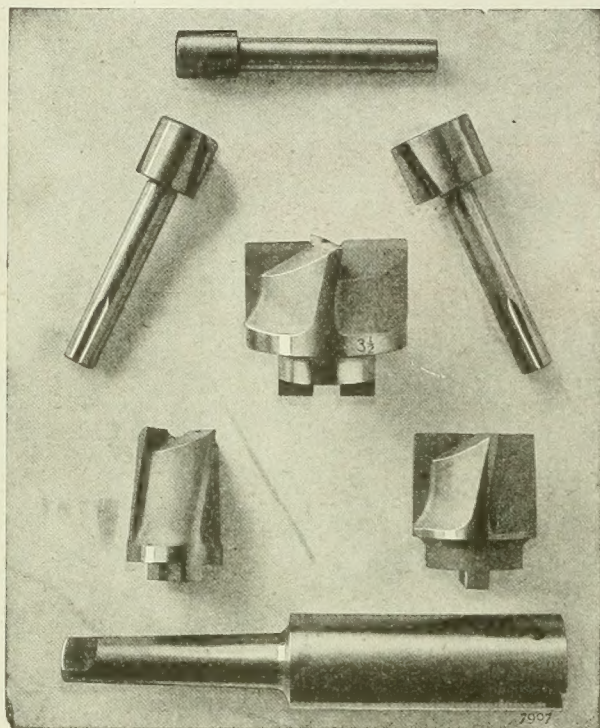
MONTREAL, Que.
412 St. James St., W.



SMALL TOOLS

Equip Your Tool Room With

PRATT & WHITNEY Interchangeable Cutter Counterbores



PROMPT SERVICE

is assured at our nearest store where P. & W. Small Tools are carried in stock. Place your order there to-day.

and get the right combination at once.

HOLDER, CUTTER and GUIDE

With this combination you can immediately make the right combination for every counterboring job.

HOLDERS

End of holder is milled to receive the driving lug of the cutter, and there is also a hole and set screw to accommodate the shank of the guides.

GUIDES

Are of hardened tool steel. They are held in place by means of a set screw in the holder engaging a V-slot in the shank of the guide.

CUTTERS

Can be furnished of either carbon or high-speed steel.

The shank of the guide passes through the hole in the cutter and the shoulder between the guide and its shank keeps the cutter in place. Cutters can be sharpened on the face, and the guide is simply pushed further in the hole after grinding.

Holders, Cutters and Guides are furnished in a wide range of sizes.

PRATT & WHITNEY CO. OF CANADA, LIMITED

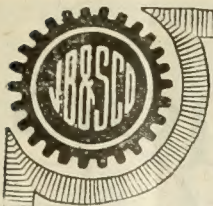
Works: DUNDAS, ONTARIO

MONTREAL
723 Drummond Bldg.

TORONTO
1002 C.P.R. Bldg.

WINNIPEG
1205 McArthur Bldg.

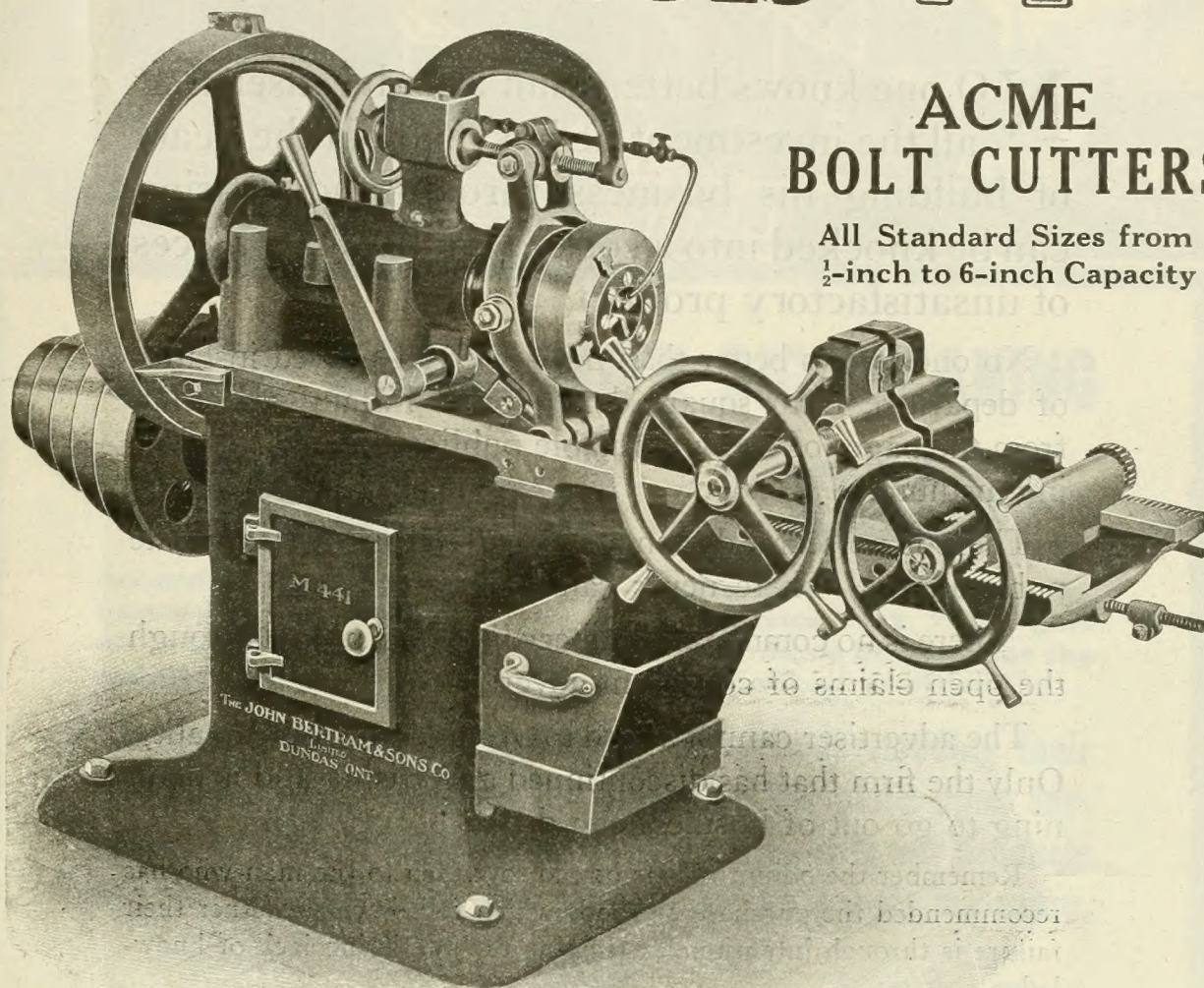
VANCOUVER
B.C. Equipment Co.



BERTRAM MACHINE TOOLS

ACME BOLT CUTTERS

All Standard Sizes from
 $\frac{1}{2}$ -inch to 6-inch Capacity



Supplied with Leadscrew Attachment for Stay Bolts or other work requiring special Accuracy of Pitch.

WRITE US FOR FULL DETAILS ON ANY MACHINE
OR MACHINES IN WHICH YOU ARE INTERESTED

The John Bertram & Sons Company Limited

DUNDAS, ONTARIO, CANADA

MONTREAL TORONTO VANCOUVER WINNIPEG
723 Drummond Bldg. 1002 C.P.R. Bldg. 609 Bank of Ottawa Bldg. 1205 McArthur Bldg.



The Publisher's Page

TORONTOJANUARY 9, 1919

NO one knows better than an advertiser that all the investment he has made in the years of building his business through advertising can be knocked into a cocked hat by a few pieces of unsatisfactory product.

No one knows better than he that ONE proved instance of departure from square dealing will instantly bar him from the pages of every reputable publication—his marketing medium.

There is no secret diplomacy in advertising in legitimate publications. There never can be.

There is no commercial bribery in orders placed through the open claims of consistent advertisers.

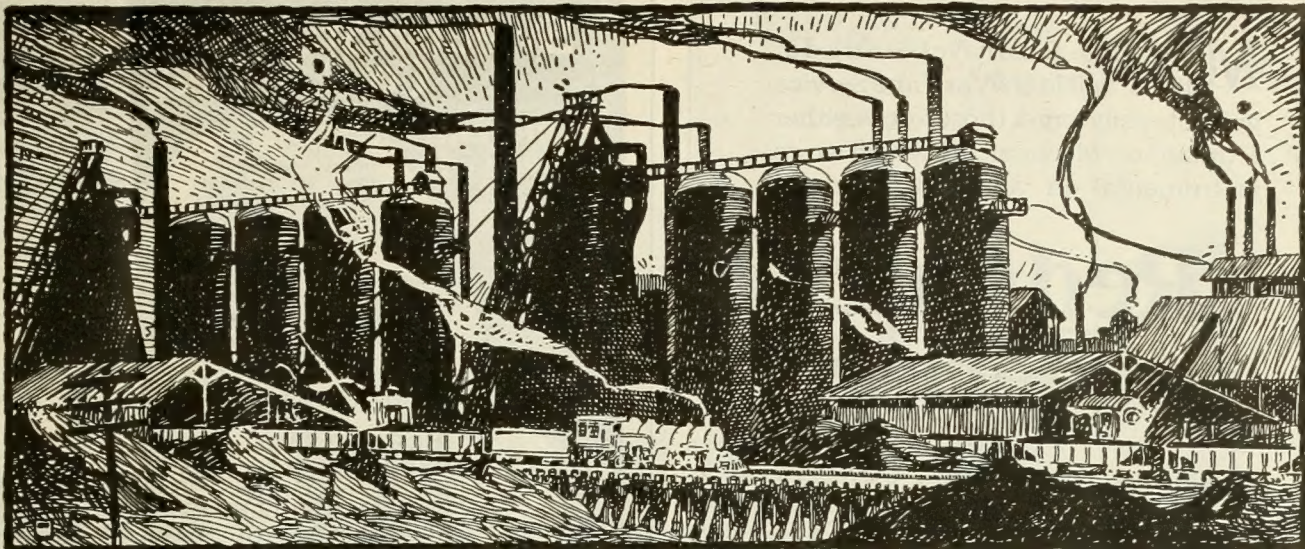
The advertiser cannot afford to profiteer or to cut quality. Only the firm that has discontinued advertising and is planning to go out of business can do so.

Remember the odium that is bound to attach to the man who has recommended the purchase of goods which fall down—whether their failure is through intentional scrimping or blundering lack of knowledge.

Remember the loss in time and production, as well as the cost of replacing, when equipment fails to fulfill the claims made for it by some irresponsible salesman. Whether his firm authorized such claims or not, the loss is on you, if that firm is not a business builder—an advertiser backing his claims with a “make-good” policy.

Think these facts over, Mr. Superintendent, when you are making out your next requisition for supplies, or when you make that recommendation for equipment.

Think them over, Mr. Owner, when you are about to put your O.K. on your superintendent's requirements.



LITTLE WORDS WITH BIG MEANING

Quality

According to "Webster," Quality is "an excellence of character; natural superiority."

Service

Webster's definition of "Service" is: "The performance of labor for the benefit of another."

We use these words advisedly—fully understanding their definitions—and realizing the obligation we place upon ourselves by their continued use in connection with our products of Iron and Steel, and our attitude to the people we serve.

THE
STEEL COMPANY
OF
CANADA

MONTREAL LIMITED HAMILTON

Pig Iron,
Steel & Iron Bars,
Horse Shoes,
Steel and Iron Products.

Steel Billets,
Track Spikes &
Bolts, Forgings, Wire
of every description.

MEN whose souls have been tried in the Crucible of War Time Service will not easily forget those forces, either Human or Mechanical, which were instrumental in achieving Victory.

"Red Cut Superior"

The Nationally Known **FIRST QUALITY**

HIGH SPEED STEEL

Is a Fighter for Efficiency in Peace Times and War Times.

Are your Tools made of "Red Cut"?

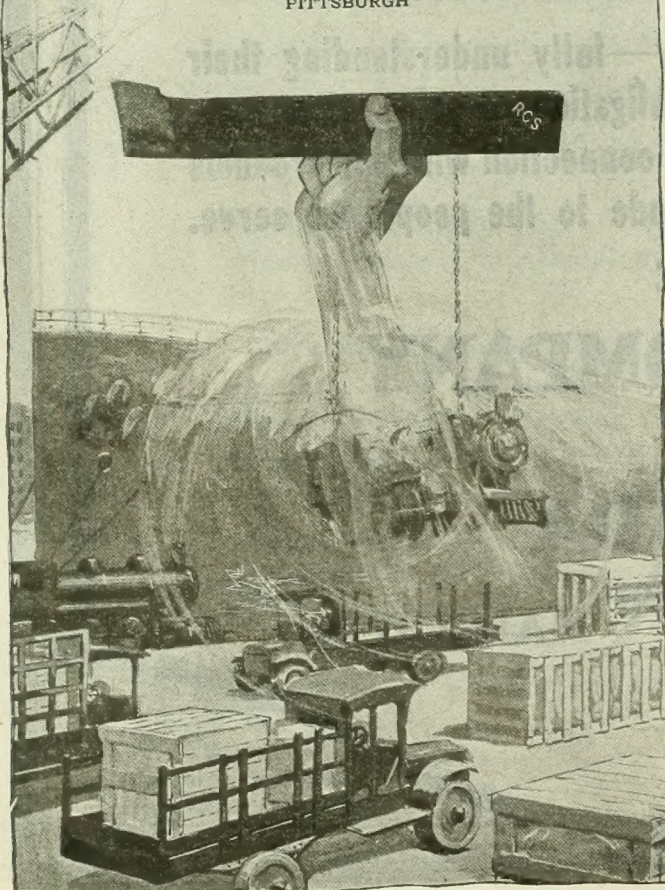
VANADIUM-ALLOYS STEEL CO.

General Sales Offices, PITTSBURGH, PA.
Works, LATROBE, PA.

BOSTON
BUFFALO
CINCINNATI

CHICAGO
CLEVELAND
DETROIT
PITTSBURGH

MONTREAL
NEW YORK
TORONTO



Swedish Steel & Importing Co., Limited

Montreal
New York

Toronto
Denver

Direct representatives of foremost Swedish mills; makers of

Tool Steels

ALLOY STEELS, BILLETS, BARS, DISCS, SHEETS, HIGH SPEED STEELS, DRILL RODS, DRAWN BARS, SEAMLESS TUBING, COLD ROLLED STRIP STEEL, WELDING WIRE, WROUGHT AND ROLLED IRON, PIG IRON, STEEL AND IRON ENDS, HOLLOW AND SOLID MINING DRILL STEEL.



PROMPT SHIPMENTS
from large stock



A
Keen
Cutter

WOLFRAM
Is Both

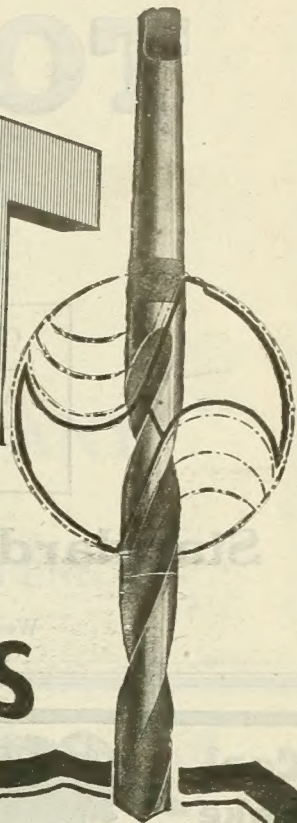
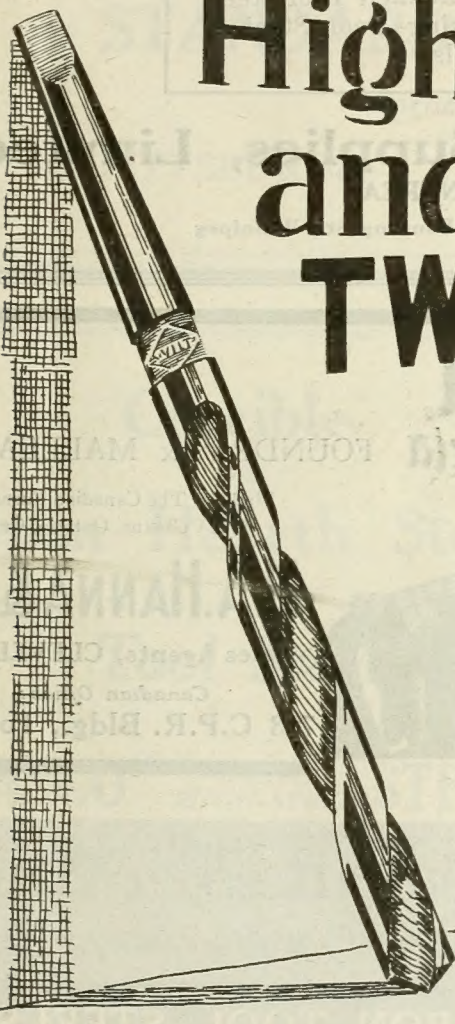
VULCAN CRUCIBLE STEEL CO.
ESTABLISHED 1900
Aliquippa Pa. U.S.A.
Represented in Canada by Messrs Norton
Callard & Company
Montreal Que.

Strong
in the
Neck

*"Where There's a WILT—
There's the Way"*

WILT

High Speed and Carbon TWIST DRILLS



WILT Products are manufactured with the sole purpose of meeting the demand for an absolutely dependable drill of unquestioned high quality.

Every WILT Product you sell is absolutely guaranteed to make good on the job, and to be free from defects in workmanship, material or design.

WILT drills are put up in neat and convenient packages for the trade and each order is carefully looked after to see that it reaches you on time and in perfect condition.

Wilt Twist Drill Co. of Canada, Limited, Walkerville, Ontario

London Office: Wilt Twist Drill Agency, Moorgate Hall, Finsbury Pavement, London, E. C. 2, England

Trade Mark Registered U.S. Patent Office

L-XX HIGH SPEED AND OTHER Atlas TOOL STEELS of QUALITY

GRADES: L-XX High Speed Steel—Atlas Hot Die Steel—
—Atlas Special Alloy—Atlas Triple Extra Tool Steel—
—Atlas Double Extra Tool Steel—Atlas Refined Tool Steel—
—Deward Oil Hardening Non-Shrinking Tool Steel—
E. B. Alloy—A C S C O Special Steels.

Standard Machinery & Supplies, Limited

261 NOTRE DAME ST., MONTREAL

Western Representative: WM. W. HICKS, 557 Banning St., Winnipeg

**Coal
Coke
Iron Ore**



Pig Iron

Victoria

FOUNDRY & MALLEABLE

Made by The Canadian Furnace Co.
Port Colborne, Ontario, Canada

M.A. HANNA & Co.

Sales Agents, CLEVELAND

Canadian Office:
703 C.P.R. Bldg., Toronto

FIRTH'S

Speedicut ^{HIGH} SPEED Steel

The Ideal Steel for Machining Shells

FIRTH'S CARBON TOOL STEELS

Standard Brands

Highest Quality

THOS. FIRTH & SONS, Limited, Sheffield, England

CANADIAN WAREHOUSES

449 St. Paul St. West, MONTREAL
79 West Adelaide St., TORONTO

J. A. SHERWOOD
Canadian Manager

URANIUM

HIGH SPEED STEEL

If your lathe and planer tools must take deep cuts in hard stock and are frequently subjected to strain these tools should be URANIUM. They last longer.

The presence of URANIUM makes the steel tough enough to permit machines operating at high speeds.

We'll send you a piece for trial.

STANDARD ALLOYS COMPANY

Forbes and Meyran Avenues

PITTSBURGH

PENNA.

Crucible

AND

Open Hearth Steel

Tool Steel

"ARGO" BRAND HIGH-SPEED STEEL

The John Illingworth Steel Co.

1856

Frankford,
New York Office

Phila.
217 Broadway

RALPH B. NORTON, AGENT
Montreal, Canada

Electrite

Electric furnaces, automatically regulated, the most modern methods, and the introduction of Uranium — make this a steel of truly remarkably cutting properties.

We know "Electrite" cannot be bettered — and stand ready to prove it to you.

LATROBE
ELECTRIC STEEL CO.
LATROBE, PA.

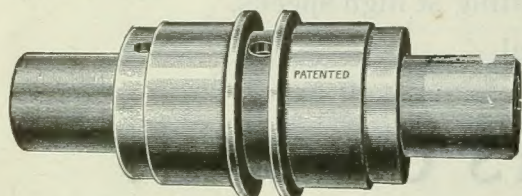
High Speed Steel

uranium

THE JOHNSON FRICTION CLUTCH

In the "Snyder" and a Host of Other Drill Presses

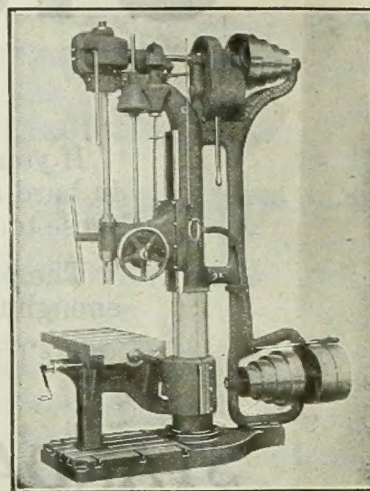
We feel justified in saying that Johnson Friction Clutches are in use wherever efficient drilling machines are manufactured. Every day sees new names added to our long list of machines which have Johnson Friction Clutches in their design. This wouldn't be so if there wasn't something a little better than ordinary about Johnson Friction Clutches. A simple request for information about your own proposition will bring surprising details and prices.



Double Clutch—Exterior.

*Write us for our
Yellow Data
Sheets*

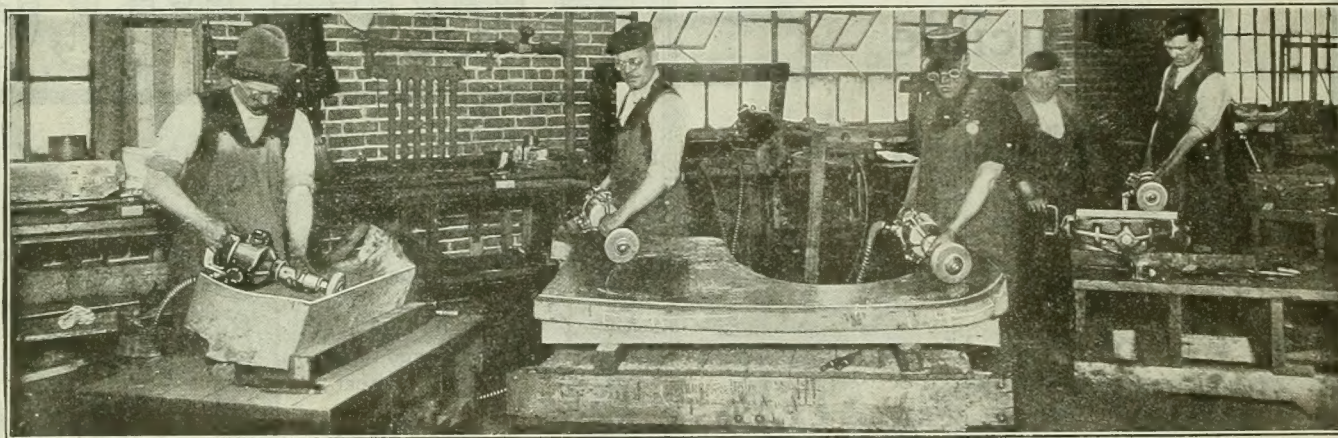
HERE



Courtesy of J. E. Snyder & Son, Worcester, Mass.

AGENTS: CANADA—Williams & Wilson, 320 St. James St., Montreal; The Canadian Fairbanks-Morse Co., Ltd., Toronto and Branches. ENGLAND—The Efundem Co., Ltd., 22 Newman St., Oxford St., London, W. 1, Sole Agents for British Isles. AUSTRALIA—Edwin Wood Pty., Hdwe. Chambers, 231 Elizabeth Street, Melbourne, Victoria. JAPAN—Andrews & George Co., 16 Takegawacho, Kiobashiku, Tokyo. SOUTH AFRICA—D. Drury & Co., Main Street, Johannesburg. FRANCE—Anciens Etab. Glaenger & Perreaud, 18 Fauborg du Temple, Paris.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

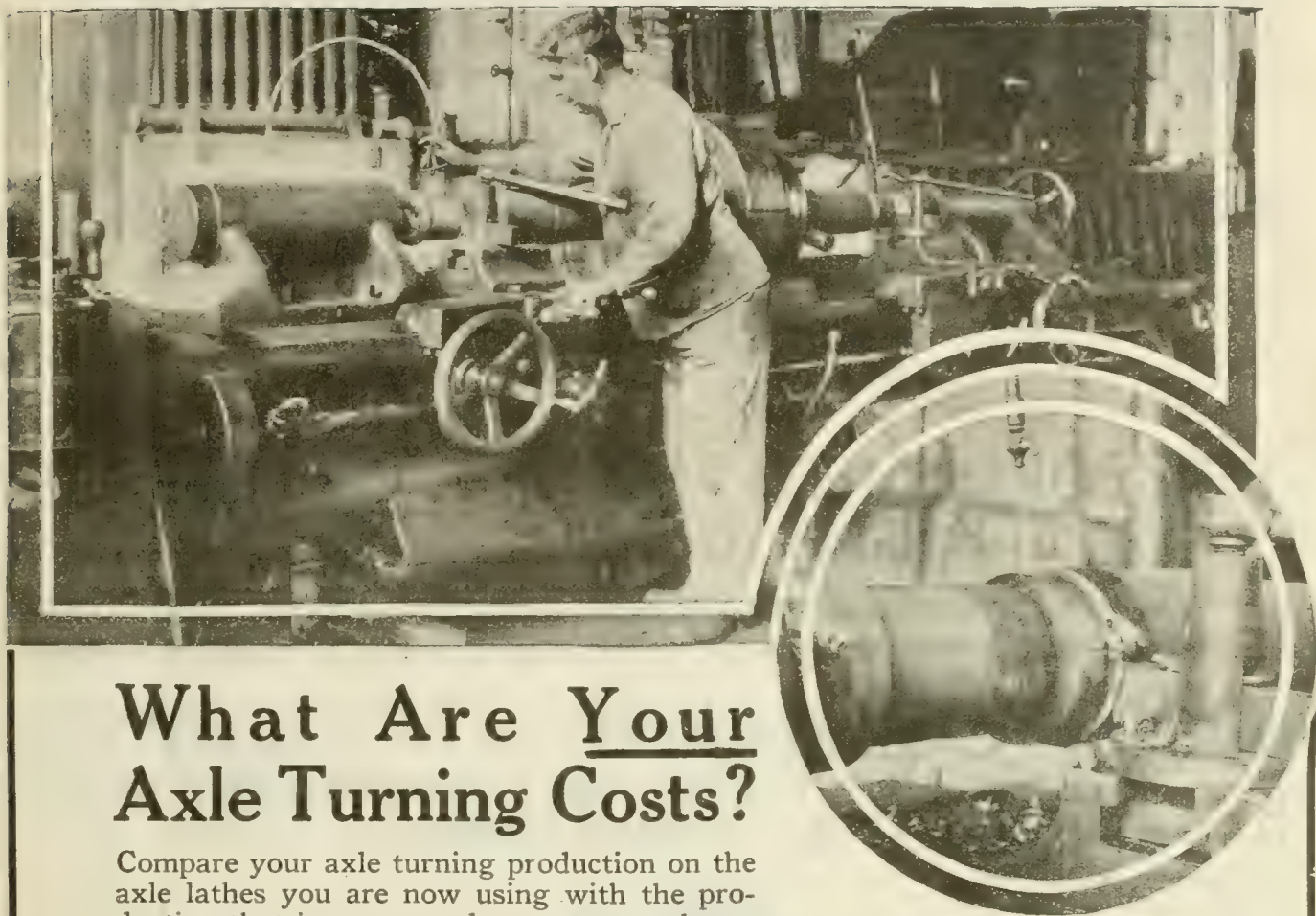


How One Plant Uses The "LITTLE DAVID" GRINDER

CANADIAN INGERSOLL-RAND CO., LTD.

With Offices at
SYDNEY, SHERBROOKE, MONTREAL, TORONTO, COBALT, WINNIPEG, NELSON, VANCOUVER

BRIDGEFORD



What Are Your Axle Turning Costs?

Compare your axle turning production on the axle lathes you are now using with the production that is an every day output on the

Bridgeford Heavy Axle Lathe

For example, in the Western Avenue Shops, Chicago, of the C. M. & St. P. Ry., car axles are actually turned to size from rough turned axles in 21 min. and 50 sec. per axle. The actual machining operations are as follows:

1. Setting up	3 min.	35 sec.
2. Turning dust collars	2 "	35 "
3. Roughing cut on journal	3 "	10 "
4. Finishing cut on journal	3 "	35 "
5. Rolling journal (special tool)...	3 "	30 "
6. Polishing journal		55 "
7. Turning wheel seat	2 "	15 "
8. Taking down	2 "	15 "

Total.....21 min. 50 sec.

This is not a "framed up" job, but the daily production output—a production that has been consistent since the lathe was installed 3½ years ago.

Put your axle problems up to us. We have some interesting facts that will show you how you can reduce your axle turning costs.

BRIDGEFORD MACHINE TOOL WORKS

161 WINTON ROAD, ROCHESTER, N.Y., U.S.A.

Heavy Engine Lathes

Heavy Axle Lathes

Secure our estimates on your requirements
in shape of
SPECIAL MACHINERY

We employ only expert machinists who have had wide experience with us in building Special Machines, outside

OUR REGULAR LINES OF

Milling Machines, Motor Driven and Belt Driven Grinders, Polishers, Disc Grinders, Swing Grinders, Hack Saws.

*Our Engineering Staff is ready to advise
on your problems.*

THE FORD-SMITH MACHINE CO., Limited
Hamilton, Ontario, Canada

Smalley General Thread Milling Machines

Two speeds—in one
minute milling 2 to 12
inches or turning 15
to 30 feet.

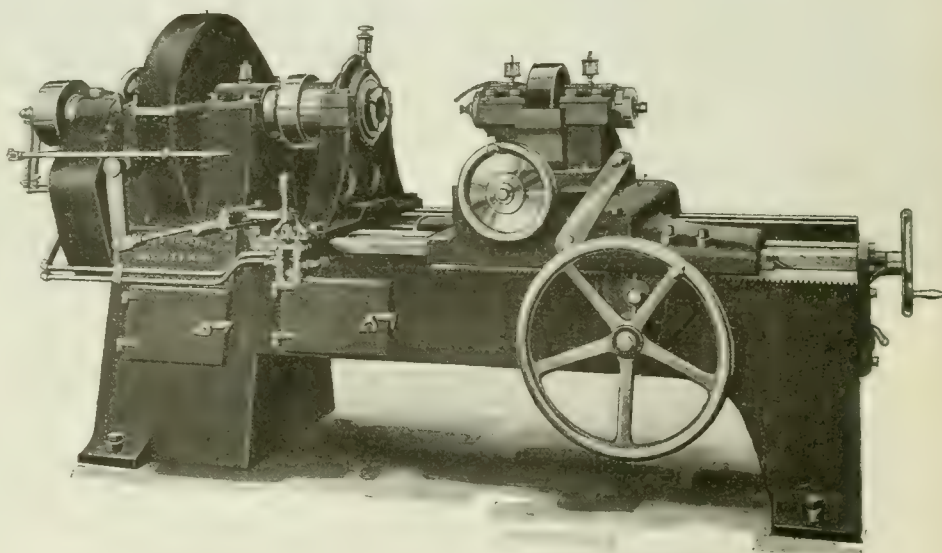
Don't misunderstand **Peace**.
It is not a signal to put on
the brakes.

Now, if ever, your shop
needs Smalley General
Thread Milling Machines to
meet commercial rivalry
ahead. They are guaranteed
to increase output 50%.

Speed extraordinary while
on extremely accurate work
won Smalley General
Thread Millers the unstinted
praise of the largest produc-
ing shell-makers on this con-
tinent. The same ability will
prove a profitable advant-
age in your commercial shop.

Write for Bulletin.

Smalley General Co., Inc.
BAY CITY, MICH.



Canadian Agents:
RUDEL-BELNAP COMPANY, LIMITED
Montreal and Toronto



HIGH SPEED STEEL

INTRA STEEL

GIBRALTAR STEEL

Tool Steel for Every Purpose

Twist Drills, Taps, Hack Saw Blades, Milling Cutters, Files, Etc.,
Music Wire for Springs, Steel Balls.
Cold Rolled Mild Steel for Shafting, Etc.

We call to your particular attention that we make a specialty of
and solicit your inquiries for

Circular Saws—for wood and for hot or cold metal cutting

Machine Knives—for cutting wood, paper, tobacco, agricultural.

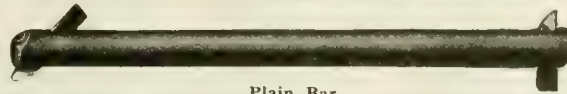
H. BOKER & CO., INC., 332 St. James Street, Montreal

Williams' "Agrippa" Boring - Tool Holders for Multiple Bars

Raise no bar against the selection of Bars. The choice is yours.



Sleeve Bar and Holder



Plain Bar

The "twin-screw" fastening with V groove at top and bottom accommodates any size of bar within its range without the use of bushings or shims.

We furnish two types of Standard Bars, Sleeve and Plain, as illustrated—they are interchangeable in the Holder.

In the *Sleeve-Bar* the Cap admits a straight or an angular Cutter; either can be quickly inserted at the business end of the Bar without removing the Cap or disturbing the setting of either the Bar or the Holder.

The *Plain-Bar* provides for the use of both styles of Cutters in the simplest manner possible.

Ask for Machinists' Tools Booklet

J. H. Williams & Co. "The Drop-Forging People"

The A. G. Low Co., Ltd.,
45 Pacific Ave., Saskatoon, Sask.
Agents for Manitoba, Saskatchewan, Alberta and British Columbia.

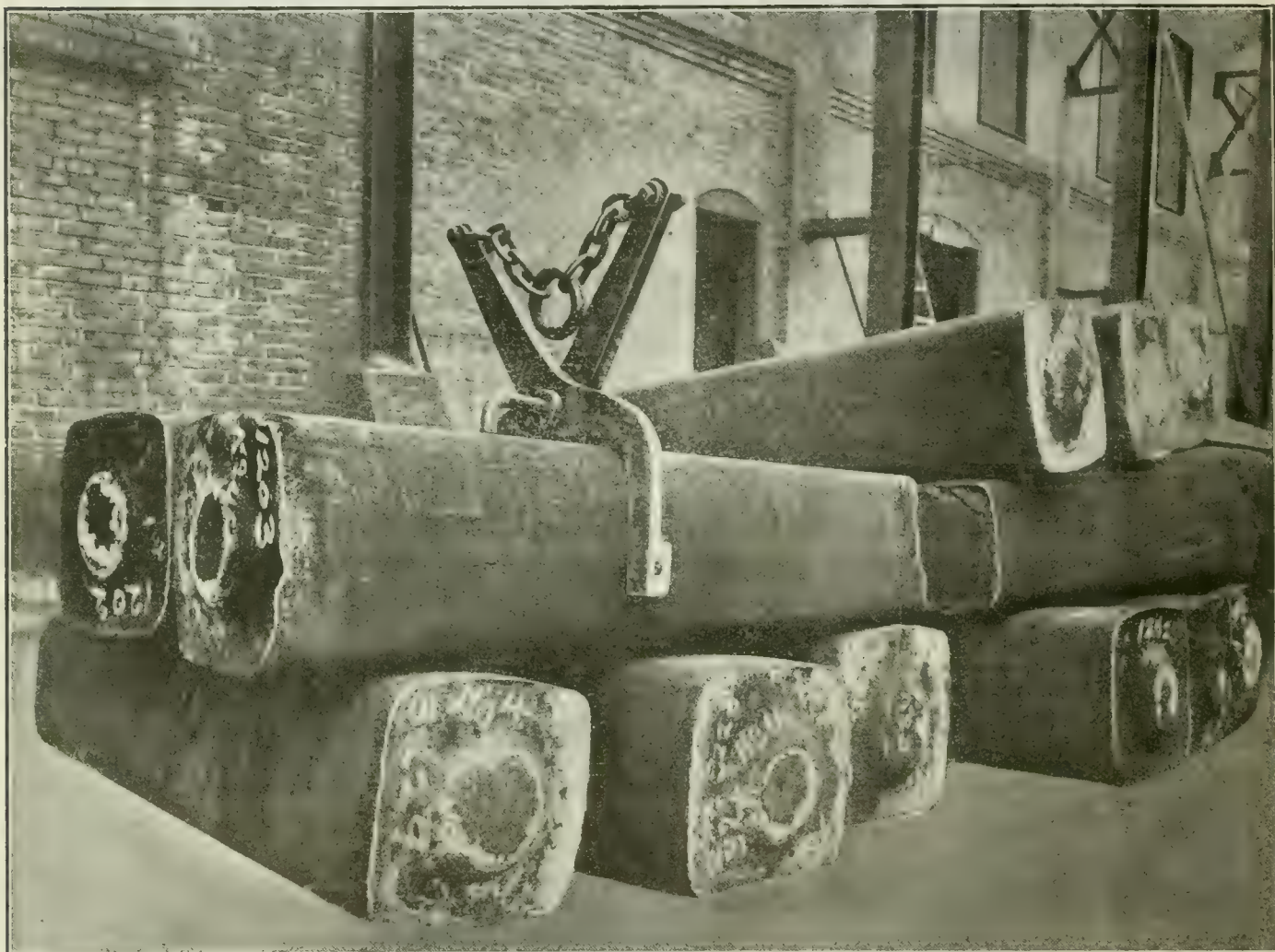
General Offices:
45 Richards St.,
Brooklyn, N.Y.

If any advertisement interests you, tear it out now and place with letters to be answered.

Nova Scotia Steel & Coal Company

Limited

New Glasgow, Nova Scotia, Canada



THREE AND ONE-HALF AND FIVE-TON "FLUID COMPRESSED" STEEL INGOTS.

The Nova Scotia Steel & Coal Co., realizing the importance of "fluid compression" as a valuable aid in producing reliable and first-class steel products, procured by purchase the Canadian license from M. Harmet, of St. Etienne, France, whereby they own the sole rights in this Country to use his process. This they considered in accordance with their policy of taking advantage of every important metallurgical development, thus advancing with modern progress, and particularly that their high reputation as manufacturers of the best marine, railway and machine forgings obtainable should be maintained.

The "fluid compression" plant laid down at Sydney Mines, N.S., consists of one group of four Harmet presses, each of 1,250 tons and capacity to handle $3\frac{1}{2}$ to 5-ton ingots; and one of 4,000 tons to handle ingots up to 30 tons.

The product of this process is used in the manufacture of high-grade forgings, such as locomotive axles, crank shafts, marine forgings, artillery tubes and armor plate of the highest grade; in fact for all commodities in which maximum reliability and homogeneity of structure enter and are demanded.

CANADA FOUNDRIES & FORGINGS LIMITED

Producers and Distributors

TOOL HANDLES

Made from Canadian Hardwoods

Quantity Business Preferred

Special service given export inquiries

JAS. SMART PLANT

Brockville, Ont.

THE ST. LAWRENCE WELDING COMPANY, LIMITED

MONTREAL, P.Q.

A. M. BARRY, Mgr.

Office and Works:
138-140 Inspector Street
Telephone: Office
Main 5779

Maritime Branch:
HALIFAX, N.S.

CONSULTING ENGINEERS on all kinds of welding. Breakdown repairs handled at once, just 'phone us and we will be on the job by next train.

OXY-ACETYLENE WELDING of heavy cast iron frames, cylinders, gears, water wheels, etc.

STEEL, any kind of welding on parts of large or small machines, tanks, digesters, boilers, shafts, brackets, etc.

Can be welded in place when necessary.

ELECTRIC WELDING on boilers, digesters, leaking tanks, etc.

MARINE REPAIRS undertaken by our Marine Welding Tug which is equipped with Electric and Oxy-Acetylene Welding Apparatus with Compressed Air Plant complete.

OXY-ACETYLENE CUTTING of any kind of steel construction.

PORTABLE WELDING APPARATUS of all kinds with trained operators always available to repair your breakdown at once.

THERMIT WELDING on all classes of work is a special feature of present activities.

Manufacturers of Steel Tanks, Air Receivers, Welded Tanks, etc.; Electric Welders, Oxy-Acetylene Welders, Boiler Repairs, Lead Burning and Thermit Welding.



ELECTRIC Steel Castings

High Grade STEEL Castings
Of Every Description

Prompt Deliveries

Send us your drawings
for estimates.

THE ELECTRIC STEEL AND METALS
COMPANY, LIMITED

WELLAND

ONTARIO

"WACO"

TRADE MARK



TRADE MARK



High Speed Steel

"Double Waco" Quality—for
Quick Production Work

"Turtle Brand"—High-class
Tool Steels, Files, Drills, etc.

MANUFACTURED BY

WM. ATKINS & COMPANY, LIMITED

RELiance STEEL WORKS

Established 1870

SHEFFIELD, ENGLAND

*Sole Representatives
for Canada*

GEO. A. MARSHALL & CO.

1118 Queen Street West, Toronto, Ontario

*Phone Park.
250*

Another MECOL Furnace

demonstrated its superior features point by point to a group of men whose years of experience in the heat-treatment of metals made them appreciative judges. We refer to the

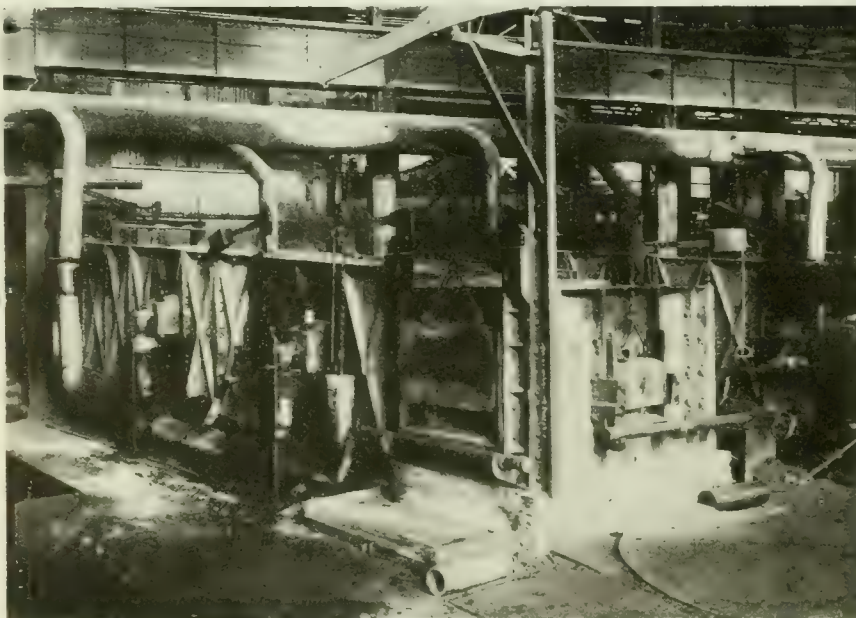
"Mecol" Furnace shown in this illustration, installed at the Pointe St. Charles Works of the Canadian Steel Foundries, Limited.

Our intimate knowledge of heat-treating methods, and our long experience in the building of efficient furnaces fit us to give helpful advice—and that we will do promptly if you

Write

Mechanical Engineering

Company, Limited
Three Rivers, Quebec, Canada





"Not Steel but its Master"

Reconstruction Period

The part played by STELLITE in the winning of the war has been no small one. It was due to the use of STELLITE and the determination of our manufacturers that Canada was able to make such an enviable record in shell production.

What Canada has done in war she can do in peace, but she must continue along the lines of rapid production and efficiency.

By the use of Arc-Welded Tools of STELLITE your production can be increased and your tooling costs reduced.

Write Our Service Department For Particulars

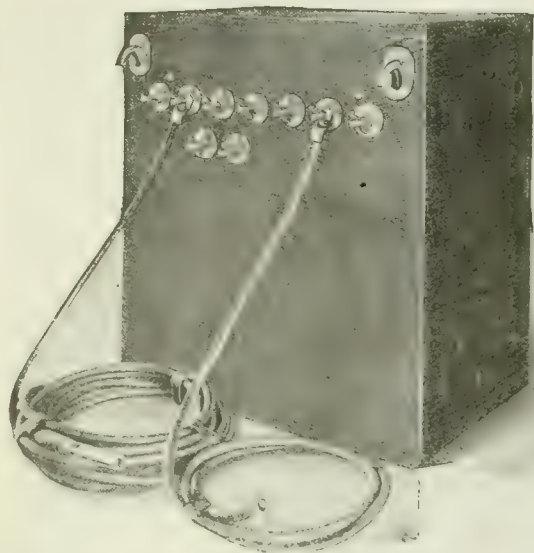
Deloro Smelting & Refining Company, Limited

TORONTO
200 King Street West

DELORO, ONT.

MONTREAL
315 Craig Street West

Alternating Current Arc-Welding



The "MEPHISTO" WELDER

**Operates on
Alternating Current**

Portable—Highest Efficiency—Lowest Operating Cost. No moving parts, therefore no wearing parts, no upkeep cost.

*Reduces welding costs to minimum
Does not require expert to operate*

The Arcwell Corporation of Canada, Ltd.

710 C.P.R. Building, Toronto

U.S. Office: 42 Broadway, New York City

WELDING AND CUTTING

OXYWELD

We Weld—

Steel

Cast Iron

Brass

Copper

Aluminum

Bronze

QUICK SERVICE REASONABLE CHARGES

EXPERT WELDERS

If necessary we will send a portable plant to
your premises for heavy work

One of the Oldest Welding Plants in Canada.

Send us—

Broken Castings

Gear Wheels

Machine Parts

Tool Holders

Boring Bars

Broken Tools

OXYWELD COMPANY, Dept. B.

10 LOMBARD STREET

Phone Main 6761

TORONTO



A Time Saver— Can You Beat It?

HAVE you noticed the Consolidated Clamp Connection on all Consolidated Presses? Grips like a vise and stays put, one of the bull-dog kind, which, when properly tightened, will not break away, or slip.

If you break it we will furnish a new one free of charge.

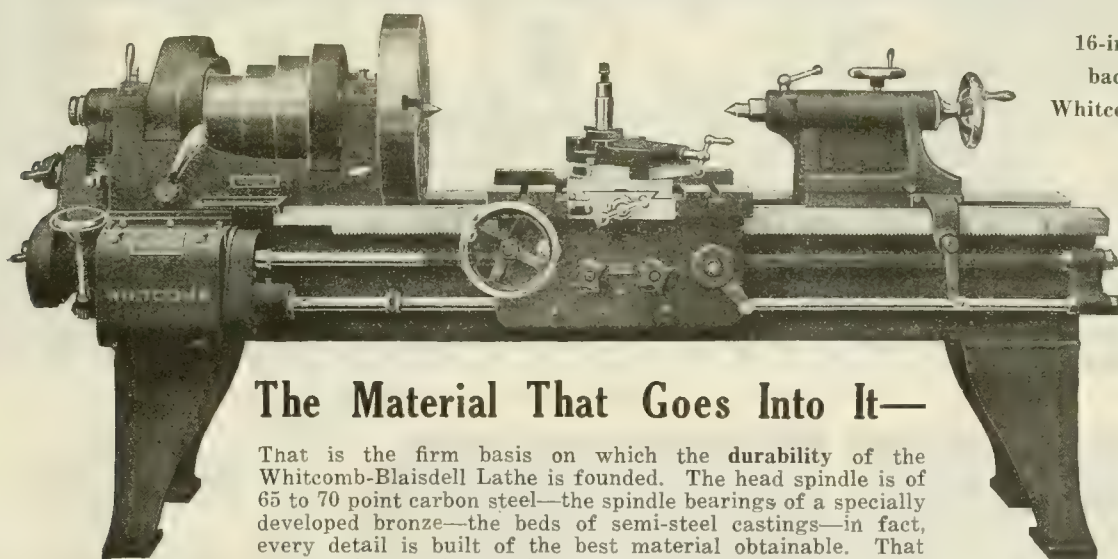
Consolidated Press Company

HASTINGS

LARGEST EXCLUSIVE MANUFACTURERS OF POWER PRESSES IN U.S.A.

MICHIGAN

Canadian Representatives: A. R. WILLIAMS MACHINERY CO., Limited, Toronto, St. John, Winnipeg, Vancouver

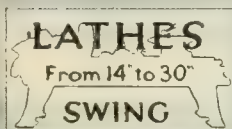


16-inch double
back geared
Whitcomb-Blaisdell
Lathe

The Material That Goes Into It—

That is the firm basis on which the durability of the Whitcomb-Blaisdell Lathe is founded. The head spindle is of 65 to 70 point carbon steel—the spindle bearings of a specially developed bronze—the beds of semi-steel castings—in fact, every detail is built of the best material obtainable. That construction, combined with the smooth, easy running secured by close accuracy, gives every Whitcomb-Blaisdell Lathe the ability to stand up under long, hard service.

Write for Catalog covering the entire line

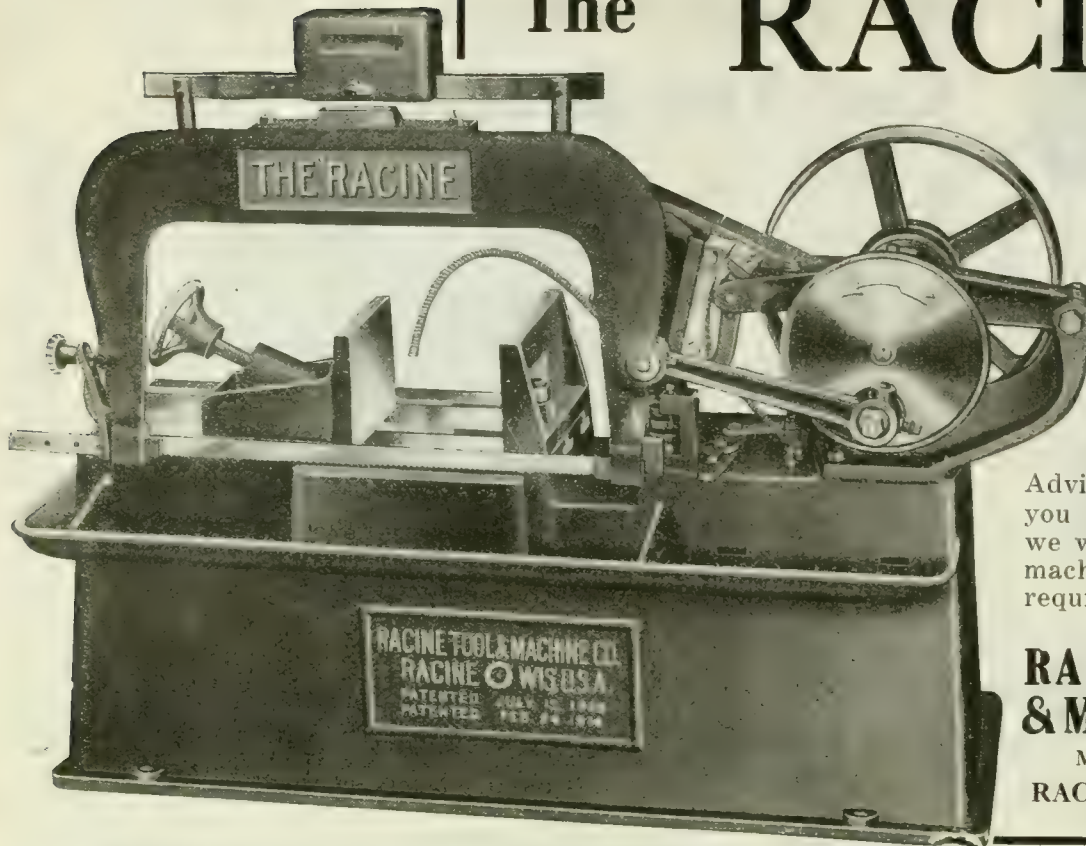


**WHITCOMB-BLAISDELL
MACHINE TOOL CO.
WORCESTER, MASS., U.S.A.**



If any advertisement interests you, tear it out now and place with letters to be answered.

The "RACINE"



For Speed
For Accuracy
For Quantity
Production
For Saving in
Blade Costs
For Saving in
Material

Advise us the size stock
you intend cutting and
we will quote you on a
machine suited to your
requirements.

**RACINE TOOL
& MACHINE CO.**

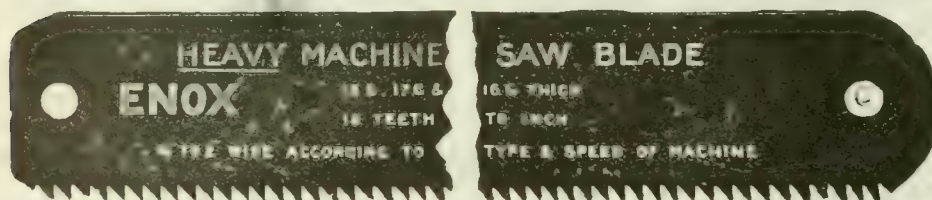
Melbourne Avenue
RACINE, WIS., U.S.A.

SIMONDS

HACK SAW BLADES

UNEQUALED IN QUALITY ANY SIZE OR LENGTH

Simonds Canada Saw Co. Limited
ST. JOHN MONTREAL VANCOUVER



AGENTS IN CANADIAN TOWNS WANTED

Liberal Terms offered to firms willing to carry
stocks and act as sole agents for the district.

Sole Makers:

FRY'S (LONDON) LIMITED

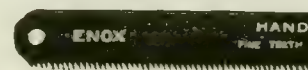
AN ENTIRELY BRITISH COMPANY

46 Upper Thames Street, London, E.C. 4,
England. Works: Greenwich, S.E. 10

ENOX

Hacksaw Blades

ARE THE BEST



Compare the Starretts

We want you to choose the Starrett Hack Saws on this strict basis of comparison. How **fast** they will cut a given piece of material, how **economic-ally**; how much better they stand up under strenuous work.

Starrett Hack Saws

are the **right** saws to use. Made of the finest tungsten steel, with properly milled teeth; flexible or hard backs. Starrett Hack Saws cut saw costs because they save time and labor.



Send for Catalog No. 213. It shows many styles and sizes of fine precision tools, and also hack saws.

THE L. S. STARRETT CO.

The World's Greatest Toolmakers
Manufacturers of Hack Saws Unexcelled

ATHOL, MASS.

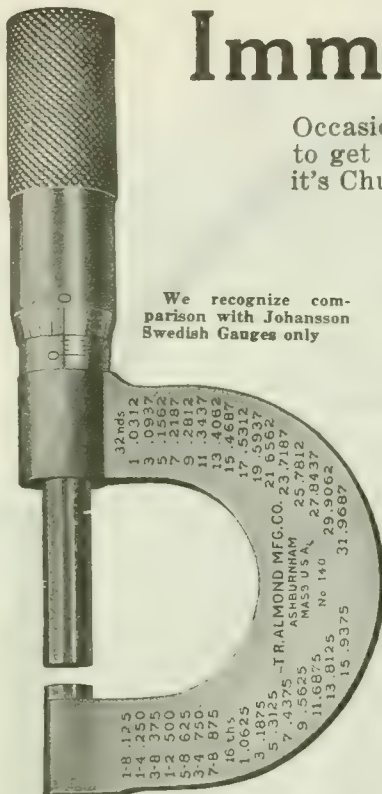
42-870

NO. 255
STARRETT

Starrett Hack Saws

Immediate Deliveries!

Occasions frequently arise now which make it necessary for you to get orders for tools delivered to you with exceptional speed. If it's Chucks or Micrometers you require, specify—



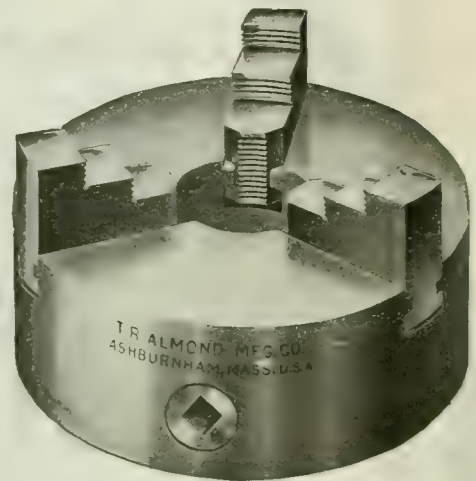
Almond

We are in a position to fill your wants for Micrometers, Drill Chucks (all sizes) and Lathe Chucks of the smaller sizes, 5", 6", 7½" and 9".

ALMOND CHUCKS are powerful, accurate and durable and cost less to operate.

ALMOND MICROMETERS — Recognize Comparison with Johansson Swedish Gauges Only.

Made in English measurements, 1", 2" and 3", by thousandths and ten thousandths; metric measurements 25 mm., 50-mm. and 75-mm. by 1/100-mm.



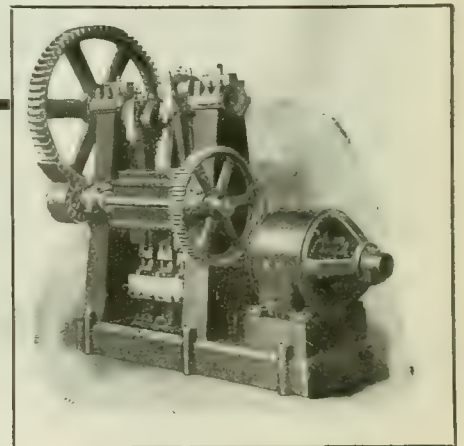
Pleased to send you full information about these quality Tools.

T. R. Almond Manufacturing Co. 5 MAPLE AVENUE **Ashburnham, Mass.**

Heavy Duty Triplex Pumps

BELT DRIVEN OR DIRECT CONNECTED

DIRECT CONNECTED OR BELT DRIVEN.
ANY PRESSURE UP TO 5,000 POUNDS,
SIZES AND CAPACITIES UP TO 4½ IN. x
14 IN.—125 GALLONS PER MINUTE.



ALSO FULL LINE OF

HYDRAULIC PRESSES, ACCUMULATORS, VALVES AND FITTINGS
FOR MUNITION PLANTS AND ALL OTHER PRESSING USES.

CATALOG "B" TELLS THE STORY

|| OUR SKILLED ENGINEERS ARE AT
YOUR SERVICE TO HELP WORK
OUT YOUR PRESSING PROBLEMS ||

The Hydraulic Machinery Co., Limited
MONTREAL **CANADA**

Any Cut a Machine Can Pull or a Tool Stand, the "Knight" Chuck Can Hold

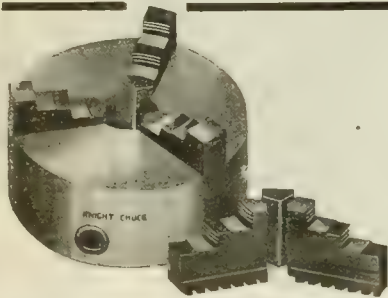
The "Knight" Three-Jaw, Universal Geared Chuck is solidly constructed, its properly proportioned jaws are exceedingly powerful, and the scrolls are very strong.

Characteristics, ease of control, prompt adjustment, adaptability and great gripping power.

Knight Metal Products, Limited

119 Adelaide St. W.

TORONTO, ONT.



*Domestic
and
Export
Trade
Supplied*

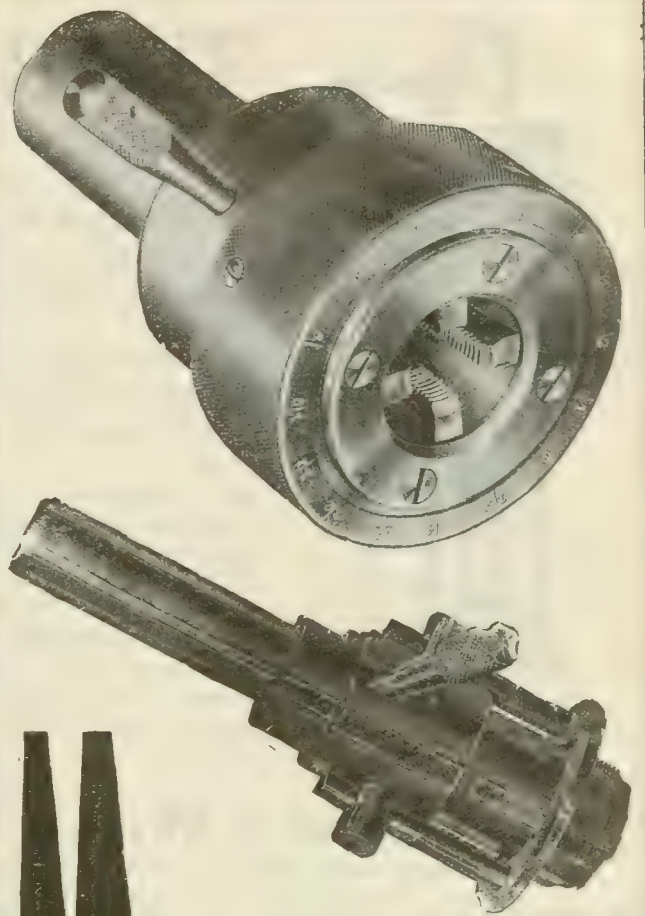
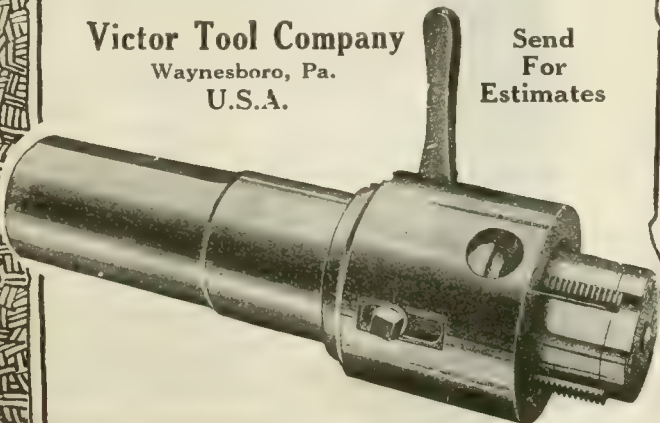
We wanted something original—this is what we got

"BOTH these operations and half another—I'll show you later—completed in the time our old taps took to do one; that, I guess, is why we continue to use your Victor Collapsible Taps."

It was the often-heard story of time saved, of costs lowered, of all threads clean and smooth. And it was pleasant to hear.

Victor Tool Company
Waynesboro, Pa.
U.S.A.

Send
For
Estimates



MURCHEY

Collapsing Taps and Self-Opening Dies

No reversing—no stripping; no need of taking the shell out of one lathe and putting it in another machine.

Fifty per cent. faster and more accurate than solid tools. No chance of work getting off centre.

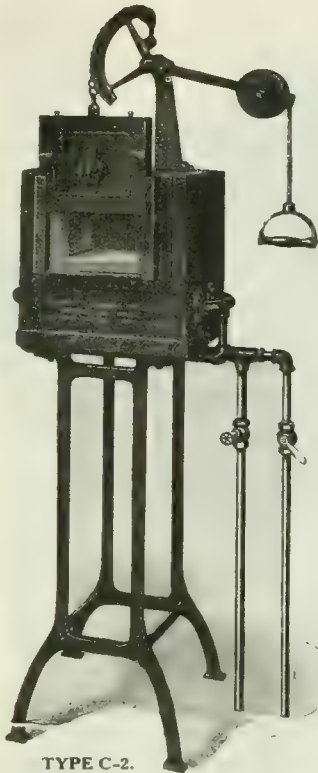
Murchey Machine & Tool Company

DETROIT, MICH. - U.S.A.

THE COATS MACHINE TOOL CO., Caxton House, Westminster, London, England; Glasgow, Newcastle-on-Tyne.

FENWICK FRERES AND CO., 15 Rue Fenelon, Paris France.

The Right Furnace For Every Purpose



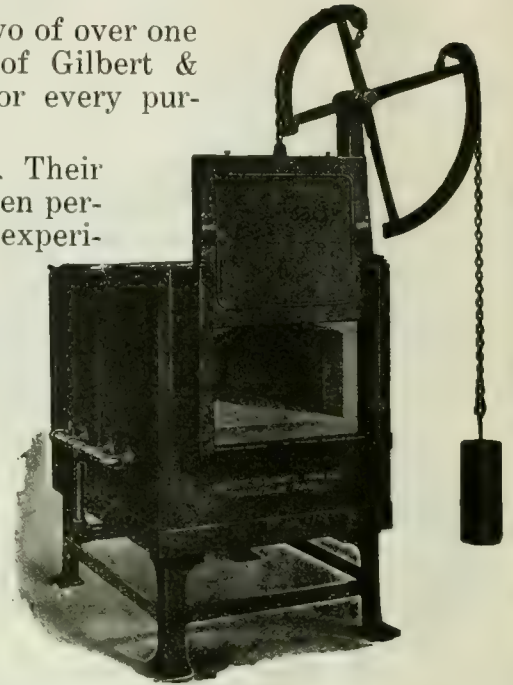
TYPE C-2.

THE types shown are only two of over one hundred types and sizes of Gilbert & Barker Furnaces—a furnace for every purpose.

G. & B. Furnaces are built right. Their construction and design have been perfected by our half century of experience.

We offer you the benefit of this experience and thorough knowledge of modern heat-treating methods through our engineering department. The service is free. Put your problems up to us.

Just now we are making prompt delivery of these two types and many others. Send for Stock List 24.



TYPE C-15.

Gilbert & Barker Mfg. Co. West Springfield
Mass.

Canadian Agents: Williams & Wilson, Montreal, Que.
New York Office: Room 1107, 25 Broadway

Quadrupled Driving Gears

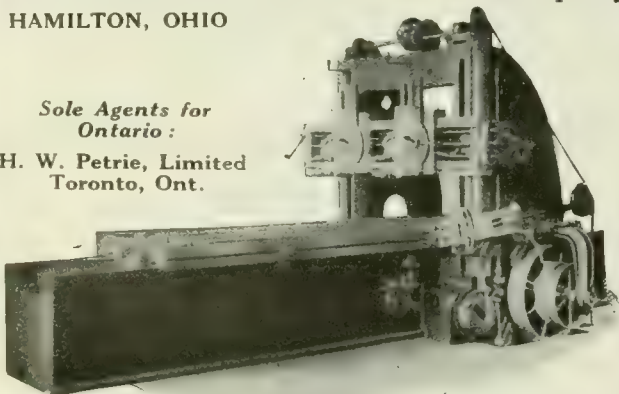
and driving mechanism of great strength and weight insure power; and the wide, extra heavy housings extending to the floor and secured to bed by tongue and groove joints in addition to bolts and dowels insure rigidity. It is this power and this rigidity that make "Hamilton Planers," 48" x 48", rapid producers on heavy precision work. For more particulars

Write

The Hamilton Machine Tool Company
HAMILTON, OHIO



Sole Agents for
Ontario:
H. W. Petrie, Limited
Toronto, Ont.



Your Riveting?



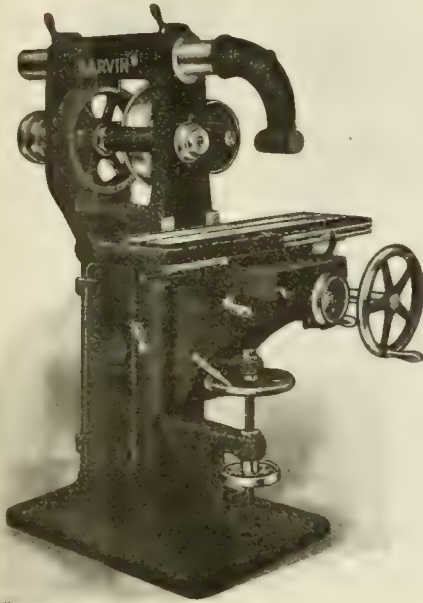
How is it done? Are you getting the necessary speed? Is the quality of the highest character? How much is it costing you?

The Grant Rivet Machine has established the records of one clean, perfectly finished rivet per second. Is that speedy enough, or is it too speedy? This is the fastest any similar machine will work and if too speedy it could be worked in conjunction with some other work. Our catalogue is worth writing for. There is one for you.

THE GRANT
Mfg. & Machine
Company

Holland Ave.
BRIDGEPORT, CONN.

GARVIN No. 11 Plain Milling Machine



No. 11 Plain Milling Machine
Use Code Abode

Adapted to the lightest kinds of small milling and light manufacturing and suitable for jewelers, makers of electrical goods, brass workers, sewing-machine manufacturers and others.

The Features of the Machine Are:

- Telescope Arm.
- Hardened and ground Tool-steel Bearing for arbor in arm.
- Spindle Bearing Taper, with adjustment.
- Power Feed driven by vertical worm shaft inside of column, which drives a worm gear clutched to the pinion shaft in the knee.
- Feed Works located and protected inside of column.
- Quick and sensitive movement of Table by Adjustable Lever and Rack Pinion.

Micrometer adjustments of Knee and Saddle.

Oil Pan around table.

Elevating Screw does not pass through the floor.

Power Feed of Table	12½ in.
In and Out Adjustment	4½ in.
Vertical Adjustment	10 in.
Net Weight, Skidded	600 lbs.

For Further Information ASK YOUR DEALER
or WRITE US DIRECT

IMMEDIATE DELIVERIES

Send for Complete Catalog

MANUFACTURED BY

THE GARVIN MACHINE COMPANY

Spring and Varick Streets

(Visitors Welcome)

50 Years New York City

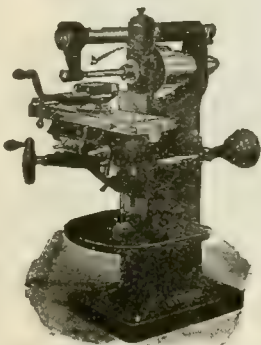
IMPERIAL GENUINE BABBITT METAL The Highest Grade Manufactured



Made specially for all HIGH SPEED, HEAVY ENGINES and EXTRAORDINARY HARD WORK

Manufactured and guaranteed to give excellent service by

**THE CANADA METAL COMPANY, Limited, FRASER AVENUE TORONTO, Hamilton, Montreal
Winnipeg Vancouver**



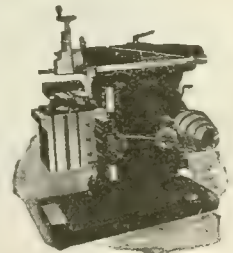
Don't Crowd Your Large Machines

You cannot manufacture small parts economically on a large machine. Steptoe Small Power Feed Millers and Hand Millers are especially adapted for that kind of work, a stiff, heavy tool that can be quickly handled and crowded to the limit. That is the machine to buy for small parts.

If your Planers are crowded take the small jobs and put them on a Steptoe Shaper and you will do them quicker and you will have less money invested in equipment.

STEPTOE SHAPERS "Just a Little Better."

CIRCULAR ON REQUEST.



John Steptoe Co., Cumminsville, Cincinnati, Ohio, U.S.A.

Canadian Representatives: Garlock-Walker Machinery Co., Toronto, Ont.

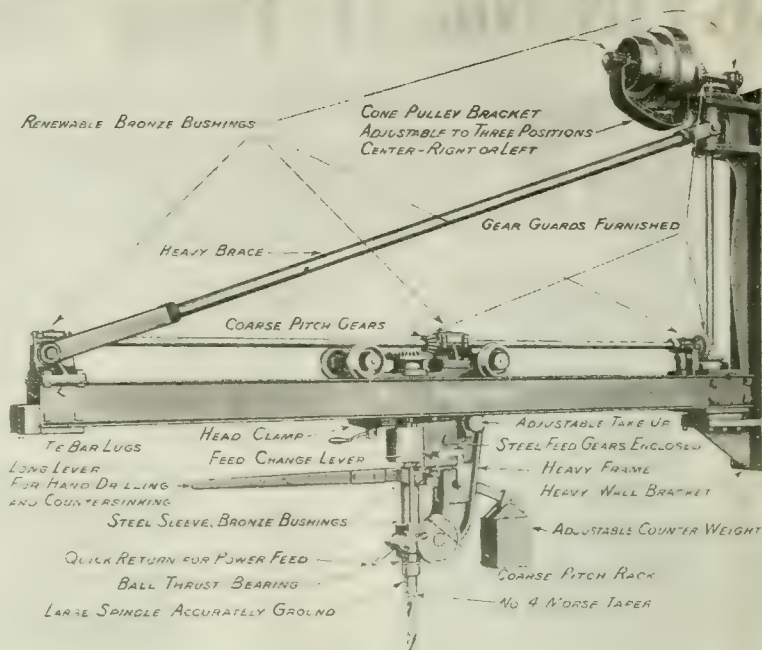
Here's a Drill You Want

The Lynd-Farquhar Wall Radial Drilling Machine is a real machine tool, carefully designed and made from the best material. The entire control of the drill is within easy reach of the operator. The arm is constructed of extra heavy channels and is supported from the outer end to the top of the wall bracket by heavy steel brace bars. The head is exceedingly rigid. It is mounted on four flanged wheels, fitted with roller bearings, and moves with extreme ease from end to end of the arm.

MADE IN FOUR STANDARD SIZES

Rated size	Drills to center of	Wall to end of arm
7 ft.	14 ft. circle	10 ft.
9 ft.	18 ft. circle	12 ft.
11 ft.	22 ft. circle	14 ft.
13 ft.	26 ft. circle	16 ft.

F.O.B. Boston, Mass.



LYND-FARQUHAR COMPANY

419-425 Atlantic Avenue

BOSTON, MASS.

TRAHERN

ROTARY GEARED PUMPS

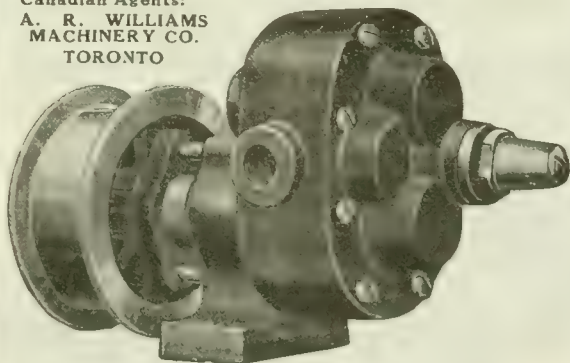
Use the Individual Pump

This is a valuable feature Trahern Rotary Geared Pumps. Would you like to try one? Write.

Different classes of work require different compounds. By using the individual system, as many different compounds as desired may be used.

Traherne Pump Company, Rockford, Ill.

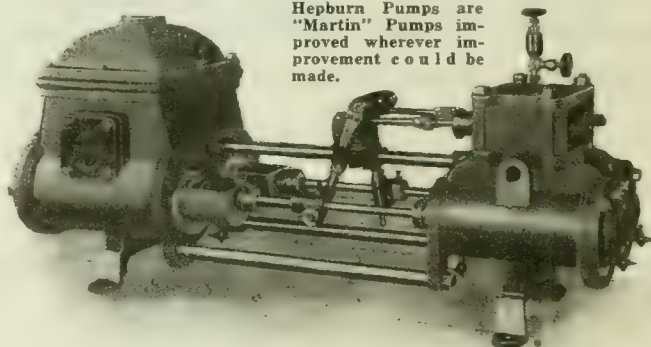
Canadian Agents:
A. R. WILLIAMS
MACHINERY CO.
TORONTO



Hepburn Pumping Machinery

Our line embraces standard duplex pumps for boiler feeding and for fire and general service; tank or low service duplex pumps; duplex hydraulic pumps for service in connection with hydraulic lifts and presses, accumulators and oil presses; pressure or mine pumps; horizontal power pumps and air and circulating pumps, etc.

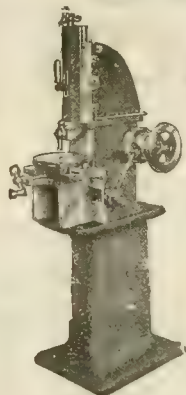
Hepburn Pumps are "Martin" Pumps improved wherever improvement could be made.



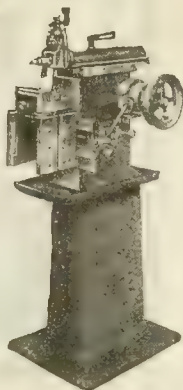
JOHN T. HEPBURN, LIMITED

18-60 Van Horne Street

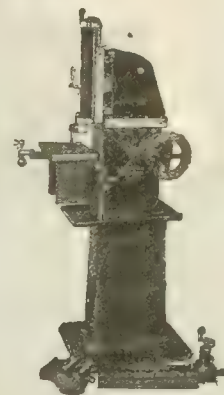
Toronto, Ontario



3 1/2-inch Slotter



7-inch Shaper



Three of the machines that by their cost-reducing features have established themselves "solid" with the home users and by these same merits are reaching out in foreign countries. A silent, but powerful message of the Rhodes efficiency.

Their capacity is greatly promoted by the adjustments which may easily and quickly be attached. For shaping, slotting, die making, tool making, etc., these machines stand paramount. An inquiry on your stationery will receive prompt attention.

The Rhodes Mfg. Company

Owned and Operated by the Jacobs Mfg. Co.

Hartford, Conn., U.S.A.



"The Marshalltown Throatless Shears"

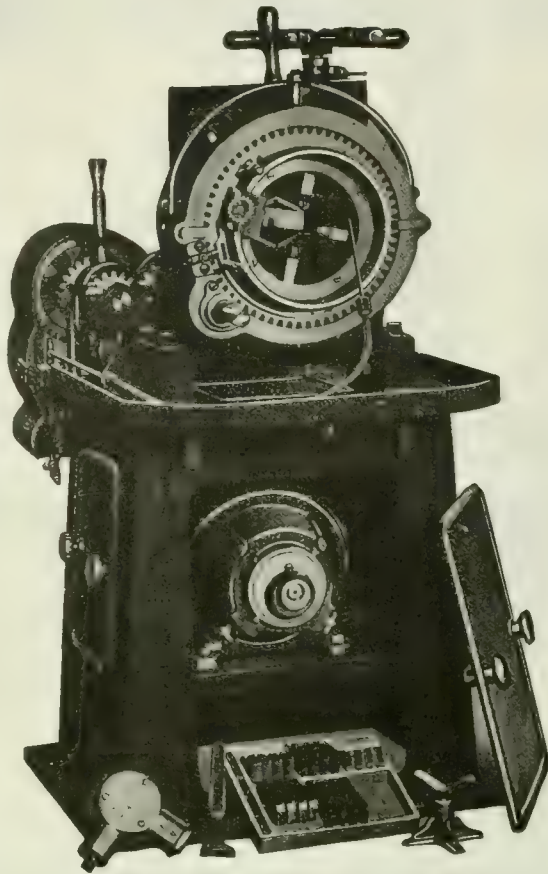
guarantees perfect work at less than half the ordinary expense.

Rotary, self-feeding shears designed for cutting in and out curves, straight or irregular shearing, circles, also beveling and splitting of plates. Built in various sizes having capacities from tin up to 1/2" thick. No limit to the size of sheet being cut. Hand, belt or motor drives. The last word in metal cutting shears. We also manufacture Rotary Bevel Shears, Splitting Shears and Plate Milling Machines.

Let us know your requirements.

Marshalltown Mfg. Co.

Marshalltown, Iowa
U. S. A.



"Forbes Facts"

1. One man can do the work of six against the old stock and die method of cutting.
2. It is the only machine on the market with receding gear.
3. It is self-contained and motor-driven.
4. It is portable.

These are convincing arguments for the construction and utility of this machine. Thread cutting can be performed fast, clean and true. Equipped with self-centering vise.

The Curtis & Curtis Co.
115 Garden Street Bridgeport, Conn.

STANDARD FURNACES

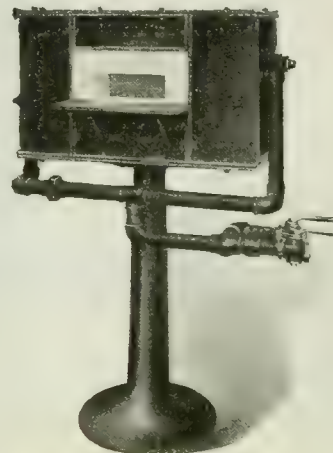
OIL
or
GAS

*Prompt delivery on all
tool room types.*

For

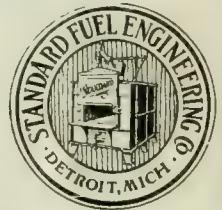
Annealing
Carbonizing
Hardening
High Speed Steel
Lead and Salt
Oil Tempering
Forging
Riveting
Shell Types

*Furnaces built for
special requirement*

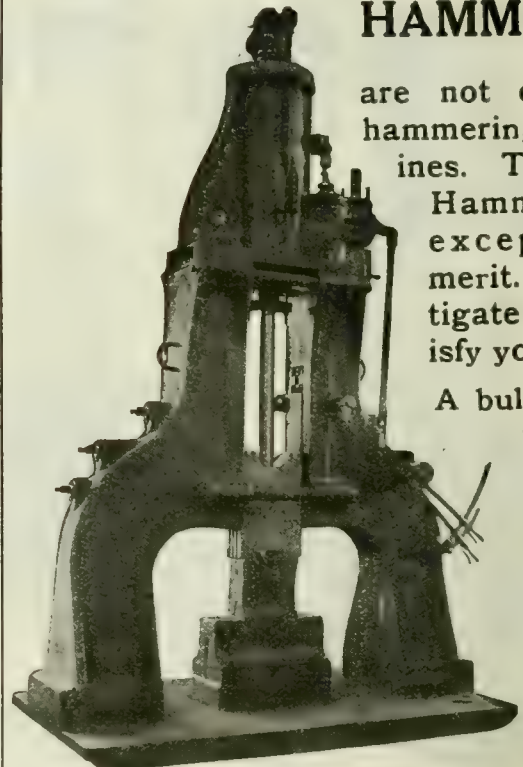


Red End Furnace or Cutting
Tool Type

TORONTO OFFICE:
Standard Fuel Engineering Co.
W. H. KIRK, Manager
909 Excelsior Life Building
Phone Main 385



"ERIE" STEAM FORGING HAMMERS



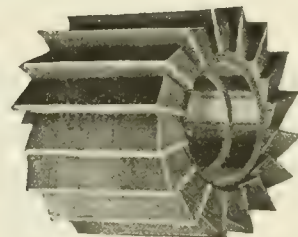
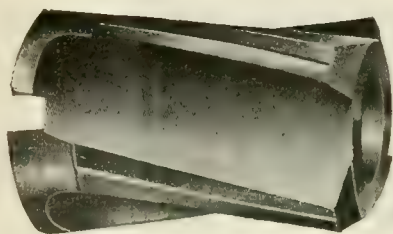
are not ordinary hammering machines. They are Hammers of exceptional merit. Investigate and satisfy yourself.

A bulletin for the asking.

ERIE FOUNDRY COMPANY
ERIE, PENNSYLVANIA, U. S. A.



We profess
to make the highest quality
High Speed Steel Tools
in the world from
**“DAVIDSONIZED”
HIGH SPEED STEEL**



**THE DAVIDSON TOOL
MFG. CORPORATION**

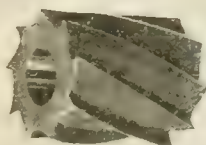
120-124 Maiden Lane, New York City

Works: 58-62 North Sixth Street, Brooklyn, New York

SELLING AGENTS FOR CANADA:

The CANADIAN FAIRBANKS-MORSE CO., Ltd.

Ottawa Toronto Hamilton St. John Quebec Montreal Windsor
Winnipeg Saskatoon Calgary Vancouver Victoria



Long Efficient Service

is insured by FAMOUS FIVE FILES.

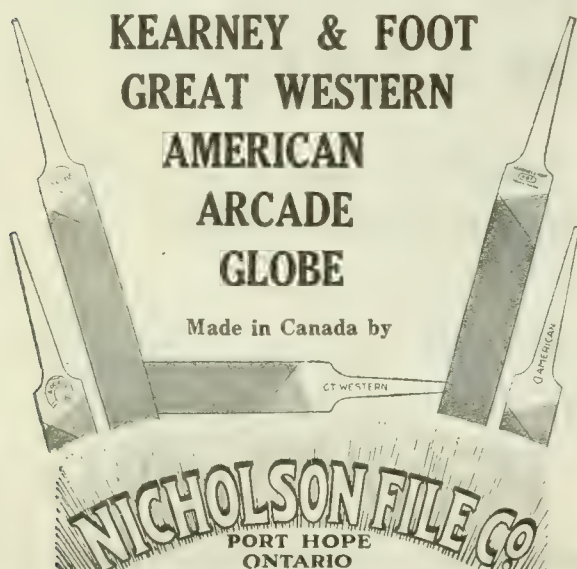
The steel—the real basis of the file—is the best obtainable for this purpose, and we make well balanced files of the right cut and shape.

The right "cut" weight and shape of a file produces the best work and insures the longest efficient life for the file.

It pays to buy Famous Five—the line that provides such a wide range to select from.

Specify them when ordering.

They are:



P X H

TRADE MARK

WHY

P.H. and IMPERIAL FILES?

Because they are made of the best file steel in America. All sizes and shapes are made of Best Crucible Cast Steel exclusively.

Because they are processed entirely by the most expert workmen in this highly specialized trade.

Because they are made in Canada by Canadian Capital and Canadian Labor.

and

Because

"They Cut Faster and Wear Longer."

Port Hope File Mfg. Co.

PORT HOPE LIMITED ONTARIO

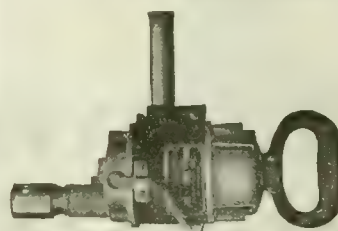
'ASK YOUR JOBBER'

IMPERIAL

TRADE MARK

U. S. Electric Drills and Grinders

Save Time, Labor and Money



They can be attached to any lamp socket.

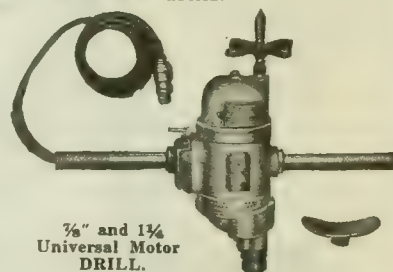
For drilling in metal they are superior to any other kind of portable drill. Cost 50% less to run than air drills.

3 SIZES
3-16 in., W.G.T., 6 lbs.
1/4 in., W.G.T. 9 lbs.
5/8 in., W.G.T. 12 lbs.

All motors wound for 110 or 220 volts.

Direct or alternating current.

Try a few of our Electric Drills and Grinders and you'll send us an order for more. Our guarantee protects you.



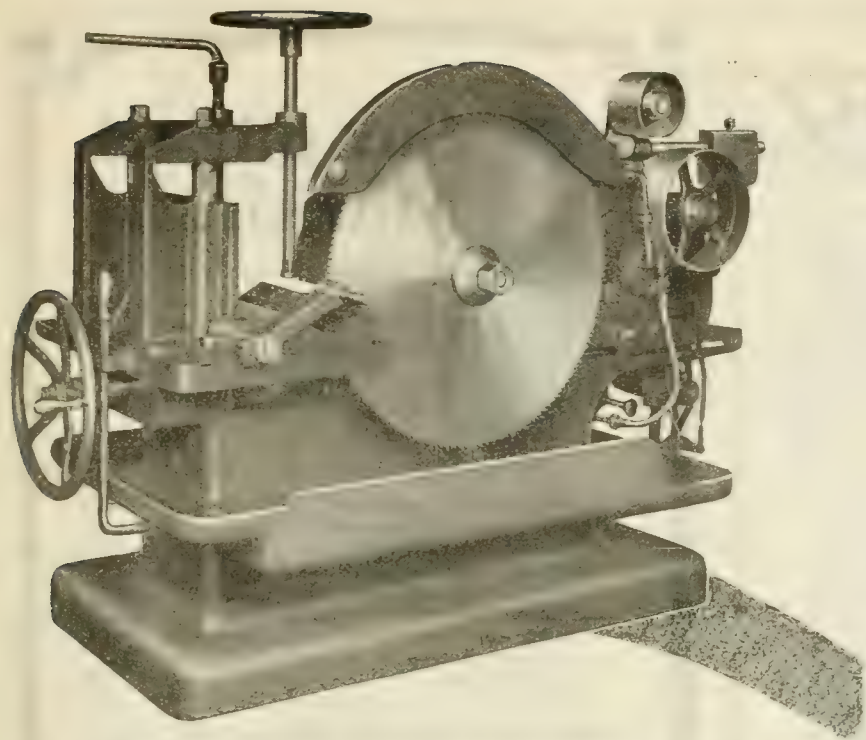
7/8" and 1 1/4" Universal Motor DRILL.

For Sale By

The Canadian Fairbanks-Morse Co., Limited

Montreal, St. John, N.B., Toronto, Winnipeg, Calgary, Vancouver

THE UNITED STATES ELECTRICAL TOOL CO.
CINCINNATI, OHIO



Save
Every
Ounce
of
Metal

NUTTER & BARNES Cutting Off Machines Help



Due to the compactness of the transmission, this Nutter & Barnes Automatic uses a much smaller saw than other machines of the same rating.

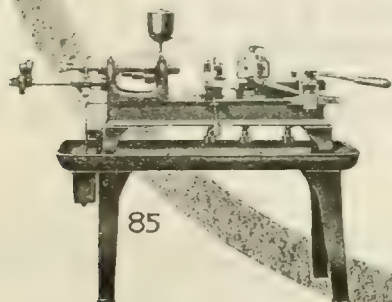
This means a narrow kerf and a material saving of metal. It also greatly reduces the cost of saw renewals—the main item in the maintenance of cutting-off machines.

To save the utmost in time, labor and materials, use machines bearing the G. T. D. mark. They can always be depended upon to be superior in efficiency and economy, and absolute in accuracy and precision.

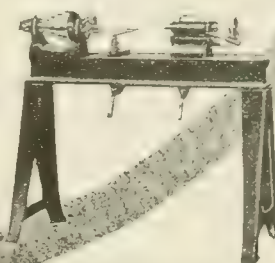
Machine Tool Division
Greenfield Tap & Die Corporation
Greenfield, Massachusetts

Canadian Agents:

Wells Bros. Company
of Canada, Limited
GALT, ONTARIO



85



Notes on Grinding


NORTON COMPANY,
WORCESTER, MASS.

No. 17A

Wheel and Work Speeds

The relation of wheel speed to work speed is most important in cylindrical grinding, for example, if the surface speed of the wheel is within the limits recommended on the wheel tag and you find that the wheel spindle boxes require frequent reworking that the surface is bluish gray when it should be light gray—that you have feed lines and chatter marks you can be reasonably sure the wheel is too hard. You can frequently overcome this difficulty by decreasing the wheel speed or increasing the work speed, or both.

KEEP THIS TAG WITH WHEEL UNTIL USED

GRINDING  WHEELS

Alundum

TRIAL WHEEL

RECORD TAG

Please return this tag to Salesman or to us direct when reporting on trial or duplicating order.

Norton No. 911051 Customer's No.

Size 10 x 3/8 x 3

Grain 80 Grade N Face

Tested at 3450 Rev.

Speed recommended - R.P.M. 1910 to 2290

Speed within above range is dependent on condition of machine, method of grinding and safety appliances used.

For grinding *Rolls 1/2" dia 3" long*

70 pt. Carbon Furth Steeling

Steel - Open fire hardened

(Please record results by either putting a circle around words or entering figures when required)

Satisfactory ☒ No ☐

Life: Days Hours

Production: Pieces Per Hour Total Pieces

Dressing *Once a day* Pieces Per Dressing Total Dressings

Cut: ☒ Fast ☐ Coarse ☐ Hard ☐ Loads

☐ Slow ☐ Fine ☐ Soft ☐ Glazes

Remarks *Wheel wear about 00025" to every 050" stock removed*

Record of Previous Wheel Used:-

Grain 46 Grade L Abrasive *Alundum*

Life: Days Hours

Cut: Fast Coarse Hard Loads

Slow Fine Soft Glazes

SEE OTHER SIDE

If the micrometer shows that you are not obtaining duplicate pieces with the index wheel at the same point, you will probably find that you are using a wheel too soft in grade. Often you can overcome this by increasing the wheel speed or decreasing the work speed, or both.

Norton Company has issued a chart for quickly determining the surface speeds of wheel and work. One of these will be sent upon request.

NORTON COMPANY

NEW YORK STORE

CHICAGO STORE

151 CHAMBERS ST.

11 NO. JEFFERSON ST.

ELECTRIC FURNACE PLANTS

NIAGARA FALLS, N.Y.

CHIPPAWA, ONT.

Canadian Agents:—The Canadian Fairbanks-Morse Co., Ltd.,
Montreal, Toronto, Ottawa, St. John, N.B., Winnipeg, Calgary,
Saskatoon, Vancouver, Victoria. F. H. Andrews & Son, Que-
bec, Que.

Grinding Wheel Plants, Worcester, Mass.

ELECTRIC FURNACE PLANTS
NIAGARA FALLS N.Y. CHIPPAWA ONT.

NEW YORK STORE CHICAGO STORE
151 CHAMBERS ST. 11 NO JEFFERSON ST.



Simplified Marking!

Canadian munition plants who have adopted Matthews Marking Tools find their marking operations simplified, done better and at a reduced cost.

MATTHEWS' Improved Champion Steel Holders and Interchangeable Grooved Type are designed to simplify and cut the cost of interchangeable marking. Strong spring attachment of holder and grooved type keep letters and figures secure and assures accurate, straight line work. MATTHEWS' line of marking tools meet all your requirements. Send for catalog.

Canadian Fairbanks-Morse Co., Ltd.

Montreal, Toronto, St. John, Quebec, Ottawa, Hamilton,
Windsor, Winnipeg, Saskatoon, Calgary, Vancouver,
Victoria.

Jas. H. Matthews & Co. - Pittsburgh, Pa.
Steel Lettering Dies and Stamps



Reg. U.S. Pat. Office.

"METALWOOD"

Hydraulic and Hydro-Pneumatic Quick Operating Presses for Straightening, Forcing and Broaching operations.

Hydraulic Accumulator Systems complete; Pumps, Valves, Forged Steel High Pressure Fittings, etc.

Metalwood Manufacturing Co.

Detroit, Michigan

Sales Representatives

Canadian Fairbanks-Morse Co., Ltd., Montreal and Toronto;
R. E. Ellis Engineering Co., 621 Washington Blvd., Chicago;
Fairbanks-Morse & Co., Inc., 30 Church St., New York City;
Sherritt & Stoer Co., Inc., Finance Bldg., Philadelphia, Pa.

Your Grinding Problem Solved

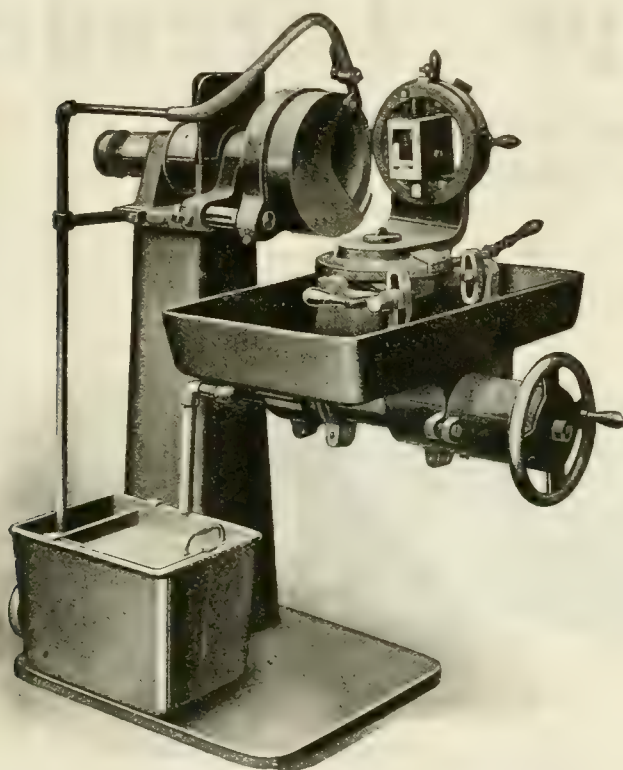
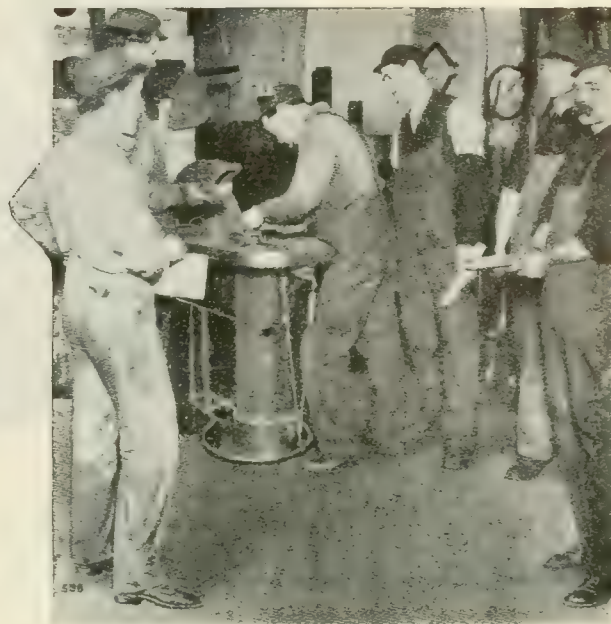
Why make your men waste their time like this?

Every time a number of workmen congregate around your old-style Tool Grinders, each waiting his turn, your production suffers accordingly.

Why not install a Gisholt Universal Tool Grinder in a conveniently located tool room and let a boy or older man grind all the tools for your entire plant?

It is the modern way; the economical way; the efficient way.

It enables you to get full working time on every lathe, planer, shaper, boring mill, screw machine and turret lathe.



The Gisholt Tool Grinder

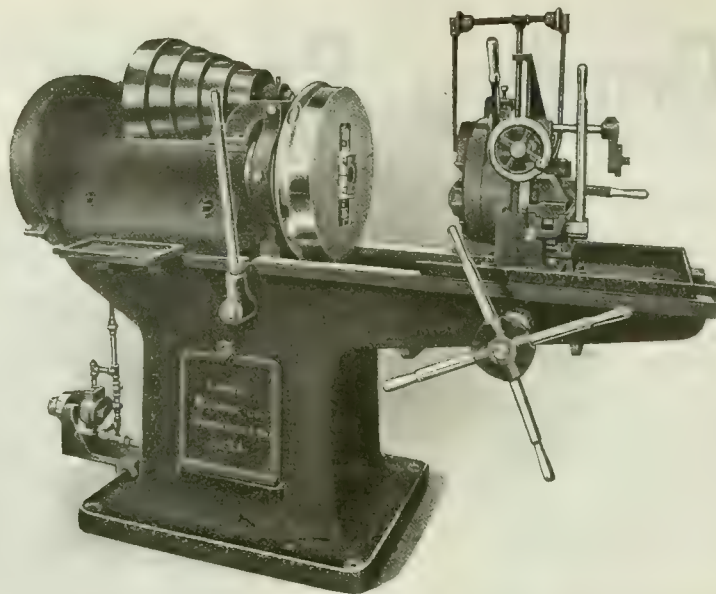
- Means no lost time for machines and operators while tools are being forged and ground.
- Insures increased production by removing the excuse for workmen to use dull tools.
- Makes your investment in machinery more productive.
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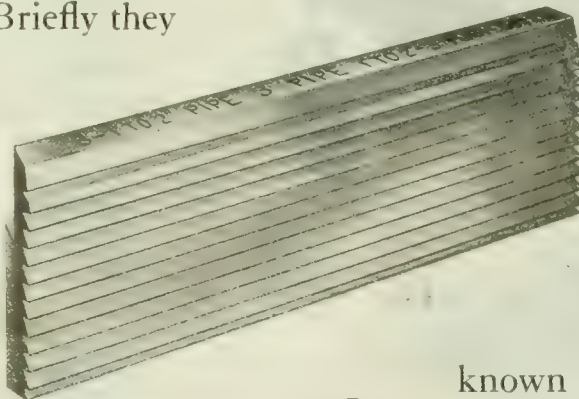
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Foundations for Various Types of Planers

Proper Foundations For Accurate Work—Various Designs For Varying Types of Machines—The Use of Levelling Blocks is Essential to Proper Work—Concrete Best For Foundations

By TERRELL CROFT

IT IS essential for accurate work that an adequate foundation be provided under every planer. This statement, in general, holds not only for planers but for nearly all other machine tools, particularly the larger ones. Often a tool is held responsible for inaccurate production when actually the tool itself is capable of doing the work, but the foundation on which it rests or the method adopted in setting it up is the cause of the difficulty. Although it does not appear to be well recognized, it is a well-established fact that foundations supporting a planer and the accuracy of leveling and alignment of its bed are as important elements in the production of good work as is the workmanship and construction of the tool itself. Planer tables are, in reality, quite sensitive, and may, with relative ease, be warped so that the close machining of metal held on them is impossible. It follows that the practice of using a planer table as a plane surface upon which to hammer things in order to straighten them, is reprehensible. When castings are to be placed on a planer table they should never be permitted to fall on it but should always be let down easily.

If a Planer Bed is Not Given Adequate Support it may warp out of shape, due to its own weight, thereby the alignment of the ways will be affected and the accuracy of the product will be decreased accordingly. The concrete foundations, the installation of which is now standard practice, will, if properly designed and installed, eliminate the possibility of difficulties of this character. It is the purpose of this article to describe modern planer foundations and the method of installing planer beds on them.

The Requirements for Accurate Planer

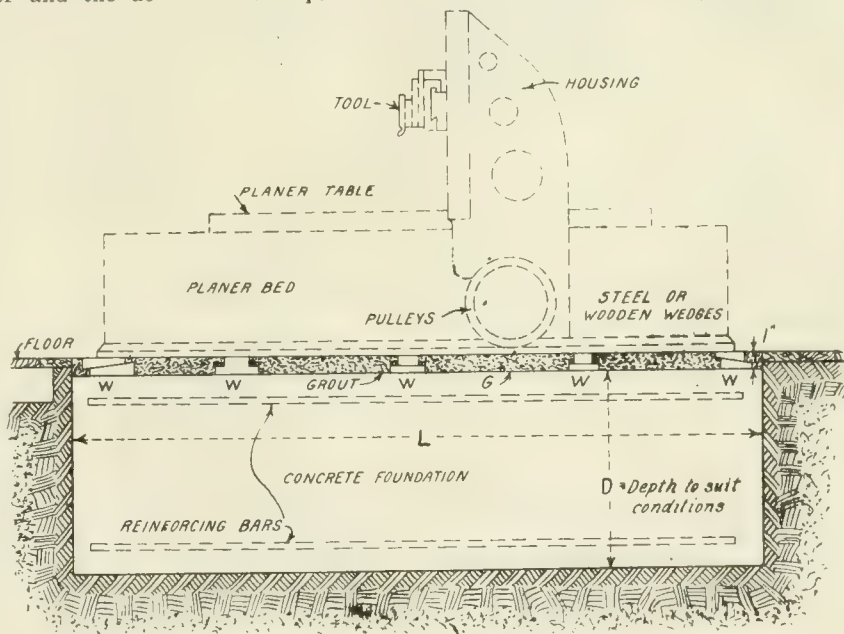


FIG. 1 GROUT BEDDING UNDER A PLANNER.

Work, in so far as the foundations are concerned, are these: (1) A planer bed should bear uniformly on the foundation and should be adequately supported by it; (2) The bed must be true and set level on the foundation and must have its centre line located at right angles to the line shaft which will drive the planer.

Planer Tables are Now Given the

Final Planing Before the Tool Leaves the Factory. It was the general practice several years ago to make no endeavor to plane the face of the table accurately until after the tool had been erected finally in the position in which it was to operate, then the final cut was taken. Experience has shown that with the modern accurate manufacturing methods it is much more satisfactory and economical to arrange to have the tool plane its own table before it leaves the factory. It is, in general, entirely unnecessary to have a modern tool plane its own table after it is set up in position, if the methods of leveling the bed (which are described below) with leveling blocks or wedges are followed. In fact, if it appears necessary to have a planer plane its own table it may be taken as an evidence of inaccurate installation.

In Installing the Planer Bed on the Foundation Its Longitudinal Centre Line must, as suggested above, lie exactly to right angles to the line shaft. This is the first consideration. If it is not satisfied, driving belt difficulties will be encountered. For the next step the bed should be leveled both longitudinally and transversely, as described in a following paragraph.

It is Often Desirable to Remove the Feet From a Planer (assuming that the planer was provided with feet, as some small planers are) before installing it on its foundation. This is particularly true if chip or shaving pockets, which will be described later, are provided. The wedges or leveling blocks used for leveling the bed should be located at the points from which the feet are removed.

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The author desires to acknowledge the assistance rendered by Arthur Pierce, foreman of the Fulton Iron Works of Saint Louis, Missouri, in the preparation of this article. Mr. Pierce has just returned from a trip through the machine-tool-building plants in the East whereby he became acquainted with the very latest developments in planer-foundation construction. He kindly offered a number of valuable suggestions and read critically the rough draft of the manuscript.

Fig. 1 shows a small planer, from which the feet were removed, which has been mounted on a foundation. Usually, where the feet are taken off it is necessary to extend the foundation above the

that it forces the bed to settle with the foundation, no matter what direction it may distort and even the best of foundations are continually changing." If a planer has enough metal in it to satis-

ter. Nor should a small planer, for which it may be deemed inadvisable to provide a foundation, be bolted to a wooden floor. If it is so bolted a heavy weight placed on the floor near the tool

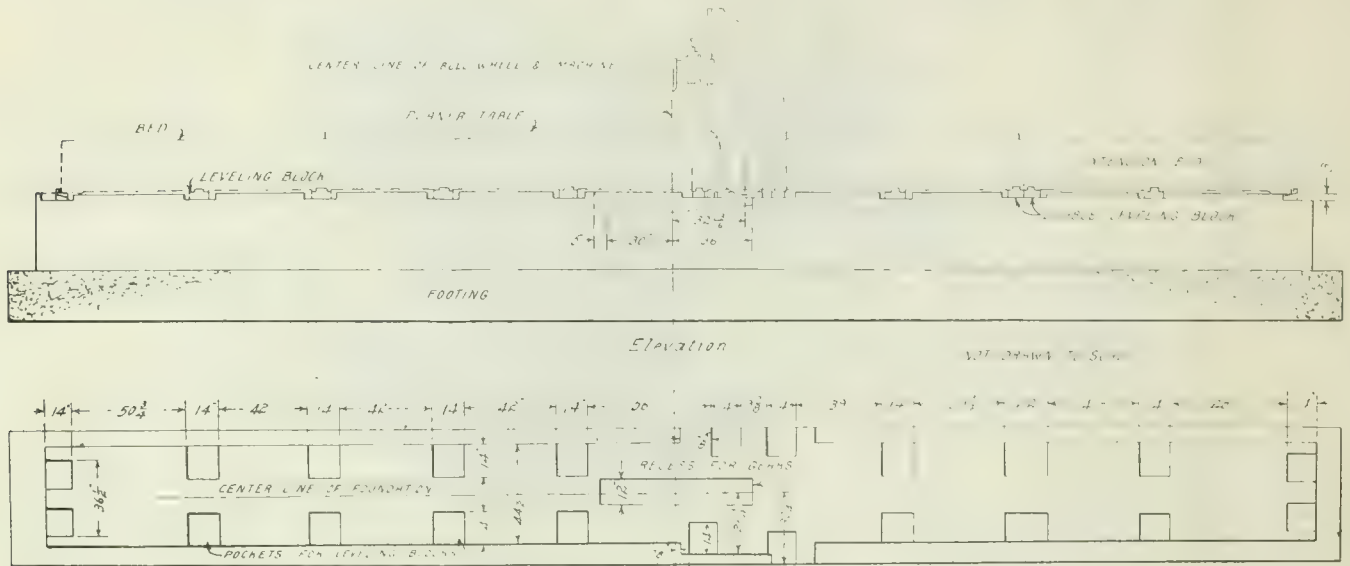


FIG. 2 FOUNDATION FOR A 42 IN. X 36 IN. X 26 FT. CINCINNATI PLANER.

floor line for a distance equal to about the height of the feet so that the planer table will lie a sufficient distance above the floor line to insure convenience in working.

A Planer Bed Should Never be Bolted Down to Its Foundation. In the words of George Langen, works manager of the Cincinnati Planer Company, "The objection to bolting down a planer is

factorily perform its functions it will not shift at reversal, nor can any stress which its belts will impose upon it raise it from the floor. If anchor bolts are provided, an ignorant mechanic may endeavor to draw the planer bed into alignment by turning the nuts on these bolts. Obviously, the only effect of such a procedure is to warp the bed, which will render matters worse, rather than bet-

may distort the floor boards and they will, by virtue of the bolt connection, bring down a portion of the planer bed with them. Distortion of the bed and excessive internal strains in the metal will result. It follows that if a planer bed is bolted to its foundation, and this applies particularly to the very long beds (possibly 80 feet long) which are now in use, a settling of one corner or

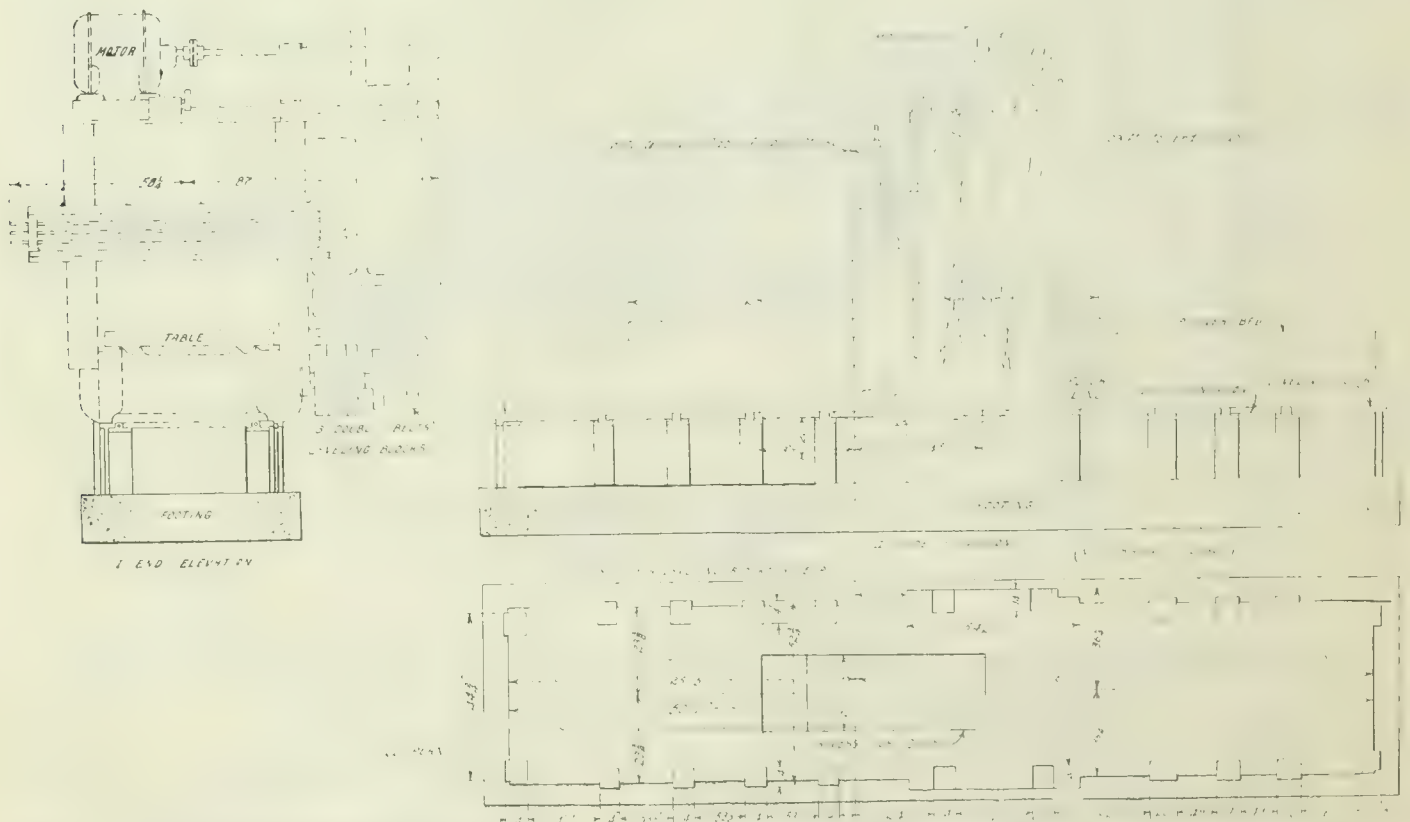


FIG. 3 FOUNDATION FOR A 60 X 48 IN. X 72 FT. DOUBLE MOTOR DRIVEN CINCINNATI PLANER

portion of the foundation will result in a corresponding distortion of the bed of the tool. At one time it was the practice to place pins, possibly $\frac{1}{2}$ inch in

cedure to be followed will depend on whether or not the surfaces on the top of the bed are machined parallel to the ways, inasmuch as the table does not

either end, because, even if the bed is not exactly level longitudinally, the accuracy of the work will not be affected appreciably provided the bed is level transversely.

The Bed of a Medium or Large-Sized Planer is usually first left a trifle high at a location under the point where the tool will cut. The reason for this is that the pressure of the tool and the mass of the housings tend to make the bed low at this location. After the housings have been bolted on, the final adjustments may be made.

The Spacing of the Leveling Wedges or Leveling Blocks under a planer bed is determined by the size of the planer. Figs. 2 and 3 indicate the recommendations as to leveling-block spacings made by the Cincinnati Planer Company for two of its planers. In general the blocks or wedges should be located approximately 4 ft. apart along each side of the bed.

In Setting Leveling Blocks or Wedges they should be placed at the points where the wedges were set by the machine tool manufacturer when the planer bed was finally lined up and scraped in the factory. Some manufacturers make a practice of marking each bed with an X at each point where a leveling block or wedge was located when the bed was scraped in the shop. If a foundation drawing is furnished for the planer it will, as suggested above, indicate the

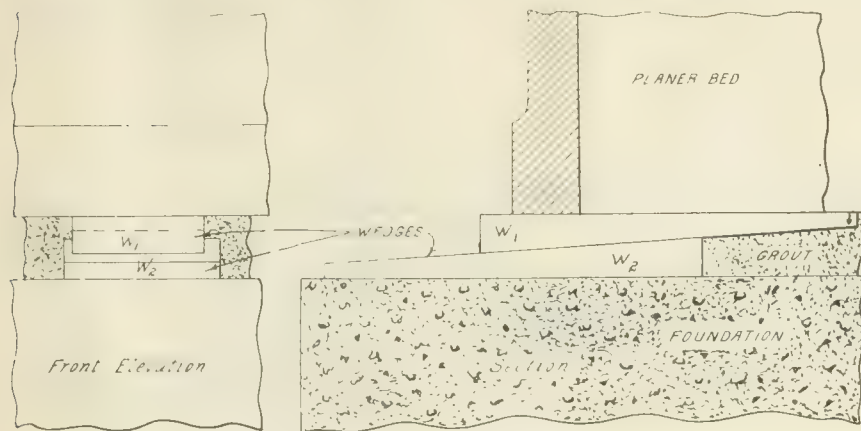


FIG. 4 HOW WEDGES ARE USED FOR LINING UP A PLANNER BED PLATE.

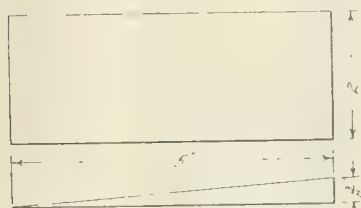


FIG. 5 WEDGE FOR LEVELLING MACHINES

diameter, and extending above the surface of the foundation 1 inch around the planer bed to prevent its being shifted during reversal or by belt pull. Such provision is now seldom, if ever made, because it is unnecessary.

Most Planer Manufacturers Furnish Foundation Plans for the Machines Which They Build. These plans, as a rule, indicate only the general proportions of a suitable foundation and the locations of the planer feet or leveling

bear on any surface except those in the grooves. In any case, no attempt should be made to level the bed until either leveling wedges or leveling blocks (which will be described later) have been inserted under the bed at the proper locations. The leveling is effected by adjusting these wedges or blocks. It is not essential for concrete work that the surfaces on the top of the bed be accurately parallel with the ways. If the

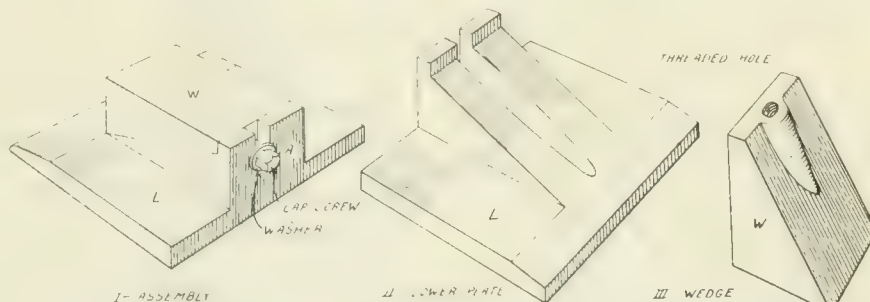


FIG. 6 PLANNER LEVELLING BLOCK USED BY THE CINCINNATI PLANNER CO.

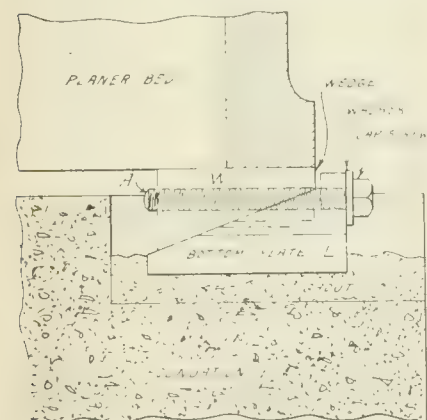


FIG. 7—SHOWING APPLICATION OF PLANNER LEVELING BLOCK.

blocks. They do not, as a rule, indicate the detailed construction which should be followed. Some of the foundation plans which have been furnished by manufacturers for planers appear to be unnecessarily complicated.

In Leveling the Planer Bed the pro-

top surfaces are not parallel with the ways the transverse leveling may be effected by placing two cylinders, each of exactly the same diameter, in each of the V-grooves and laying the level across them. To level such a bed longitudinally the level may be placed at different locations along the length of the bed in the V-grooves. However, it is the practice of some of the planer builders to machine the surfaces on the top of the bed accurately parallel with the ways. If this procedure has been followed the transverse leveling can be done by laying the level across these surfaces and the longitudinal leveling by placing the level along at different locations on the surfaces. For a medium or large-sized planer, it is necessary, in leveling it longitudinally, to place the level at a number of different locations along its length on the top surface of the bed. Any adjustments that are necessary may be made by manipulating the wedges or the leveling blocks if such are used. Accurate longitudinal leveling is not so essential for a small planer, particularly one which rests on only two legs, one at

proper locations for the leveling blocks. If the leveling blocks are not placed at the points where blocks were located when the bed was scraped in the factory it is obvious that, due to deflection, the ways will not be exactly level.

Wedges Grouted in a Foundation Top Are Found Satisfactory for Leveling Small and Medium-Sized Planers for Ordinary Commercial Manufacturing. On the other hand, for accurate machine tool work it appears that leveling blocks are always desirable under the planer bed. Figs. 1 and 4 illustrate the method of grouting metal wedges under a bed. While iron wedges are preferable, wooden ones—pieces of shingles—may be used in an emergency. Wedges are first placed at the proper locations on the foundation and then the bed is mounted on them and leveled by adjusting the wedges. There should be a space of $\frac{3}{8}$ to 1 inch between the top of the foundation and the bottom of the planer bed. Then into this space the grout is poured so that it rises within the bed and supports the planer along its entire edge. A dam, arranged by

assembling boards and sticks around the outside of the planer bed is provided to confine the grout. After the grout has partially set, the surplus extending outside the lower edge of the bed can

on one another after the bed has been leveled. This shaking down may occur before the bed has been grouted, in which case difficulties due to inaccurate work will ultimately result.

in a recess (Figs. 2 and 3) provided for it in the top of the foundation. Blocks are set in the grout so that the top faces of all the wedges are approximately in the same plane. Then, after the planer bed has been set on the wedges, the final adjustments are made by turning the screws in the leveling blocks until the planer bed is, as suggested above, level in all directions. Graphite is used for lubricating the faces of the wedge and bottom plate, which slide in contact.

Leveling Blocks are Almost Essential Where a Very Accurate Product is to be Manufactured, that is, for the building of machine tools and similar work where the accuracy must be within 0.001 per ft. length. Foundations may settle individually, as outlined above, so that leveling blocks are essential to maintain the planer beds permanently in accurate adjustment. Leveling blocks are almost imperative for very long planer beds, some of which extend for 80 feet, because a foundation of this length, if constructed with a reasonable regard for cost, can hardly be built so that it will not deflect or settle to some extent.

The Economy of an Adequate Foundation Provided With Leveling Blocks is unquestioned where accurate output is imperative. It is, of course, somewhat cheaper in first cost to install a foundation of small volume and to use iron wedges instead of leveling blocks, but if the lost time that will be involved, due to inability to work close to dimensions, is considered, the investment for suitable foundation equipment will be found more than justified.

Note.—The results of a test made on a planer by the Norton Grinding Company of Worcester, Mass., after the tool had been used for a year, give an indication of the effectiveness of adequate foundations. The planer was an 18 in. x 36 in. x 18 ft. machine. It was tested with its table in place on the bed with a 15 ft. straight-edge. Under this straight-edge, tissue paper could be held at any three points on the table, which indicat-

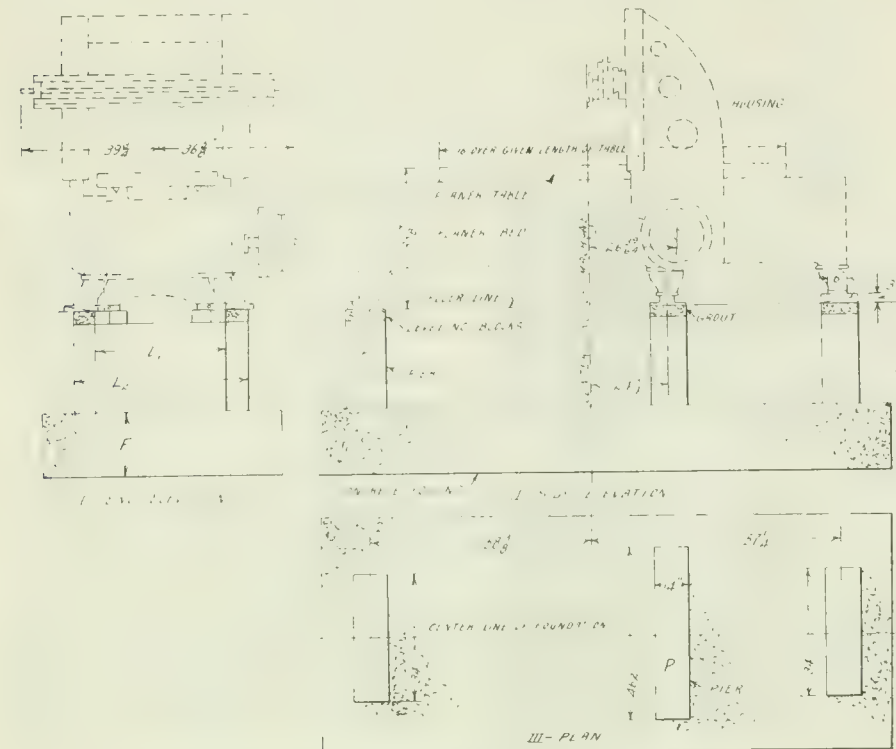


FIG. 8—TYPICAL FOUNDATION PLAN FOR A SMALL PLANER (THIS SHOWS THE PLAN FOR A 28 IN. x 28 IN. x 6 FT. PLANER).

be cut away with a trowel. While this method of using wedges and grouting may, as suggested above, be satisfactory for the conditions specified above, it is not recommended for important work, because it is, all things considered, uneconomical.

A Grout in Which Leveling Wedges or Blocks May be Set consists of one part sharp sand and one part cement by volume, first sifted and thoroughly mixed and then made to the consistency of thick cream by adding water.

Proportions for Iron Wedges may be those specified in Fig. 5 which have proven satisfactory in practice. The pitch of such a wedge should not be too great—that is, the wedge should not be

Leveling Blocks for leveling planer beds are of the general construction suggested in Fig. 6, which shows a block manufactured and recommended by a planer company. The bottom plate of the lower plate, L, has a relatively great area so that it will provide an ample bearing surface and set solidly on the grout on the top of the foundation. The upper plate or wedge, W, provides an ample bearing under the planer leg or bed. The cap screw, A, permits of rapid or fine adjustment. Fig. 7 indicates the method of its application. It will be noted that where these blocks are used the planer bed does not touch the foundation but rests entirely on the leveling blocks. There are two decided advantages which the leveling blocks have over the primitive method of leveling with wedges: (1) When the blocks are used the planer bed may be easily re-leveled at any time, if such procedure becomes necessary, due to the settling of part of the foundation or to any other cause, and (2) A planer bed may be leveled much more rapidly and accurately where the leveling blocks are used. As indicated in Figs. 2, 3, and 7, leveling blocks are, where the bed has no feet, located under it at suitable points. Where the bed has feet, as in Fig. 8, one block is arranged under each foot. It is evident that by operating the adjusting screw (A, Figs. 6 and 7) very fine graduations of level can be obtained.

In Setting Leveling Blocks (Fig. 7) the block is arranged in a grout bedding

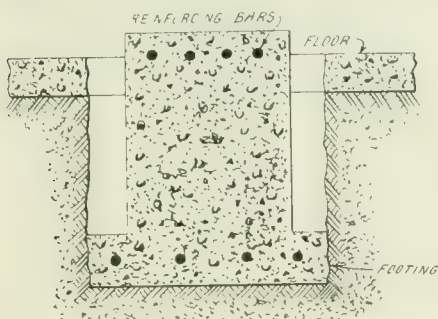


FIG. 9—TRANSVERSE SECTION OF A PLANER FOUNDATION SHOWING STEEL REINFORCING RODS

too "steep," because if it is the jar and vibration around an ordinary machine shop will often cause the wedges to slip

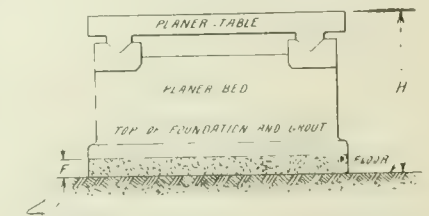


FIG. 10—HEIGHT OF PLANER TABLE ABOVE

ed that the table had maintained its level both longitudinally and transversely.

Concrete is the Standard Material for Planer Foundations because usually, all things considered, it is the most economical. Masonry, that is, brick and stone, are seldom, if ever, used now. Another advantage of concrete is that it can be, as described below, reinforced with steel. Masonry cannot be so reinforced effectively.

Simplicity of Design is Desirable for the Foundations because a simple foundation can, in most cases, be made to sustain its load just as well as will a

complicated one. Straight sides should always be used in preference to inclined ones so that the cost of forms may be made a minimum. Bevels and mitres in forms are expensive, and, in many cases, wholly unnecessary. It does not appear to be generally recognized that it is often cheaper to use a little more

A Foundation for a Medium Length Planer With Pilasters for the Leveling Blocks is diagrammed in Fig. 3. Foundations of this type have been constructed in certain shops. The provision of the pilasters, however, requires expensive form work, the excess cost of which does not appear to be justified.

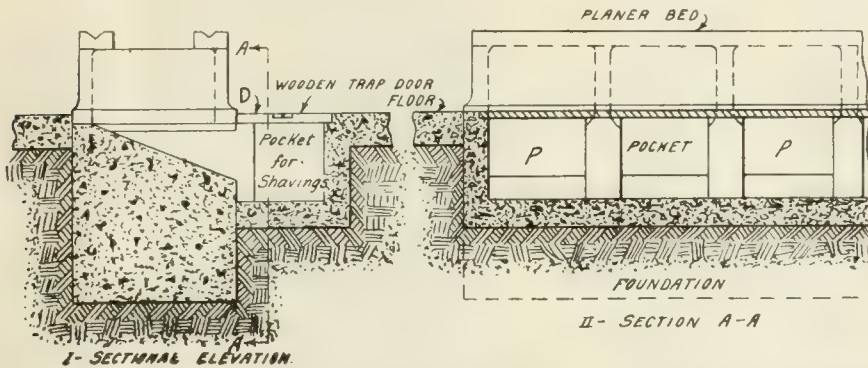


FIG. 11 SHOWING DETAILS OF A PLANER FOUNDATION WITH POCKETS FOR SHAVINGS.

concrete in a foundation than to construct a complicated form. Regular outlines, without offsets or recesses, should, therefore, be used wherever possible. Figs. 1, 2, and 8 show examples of simple, sensible planer foundations.

A Foundation for a Small Planer is shown in Fig. 1. This foundation is simply a rectangular prism of concrete reinforced with steel. Wedges instead of leveling blocks are shown on the top to support the planer bed, although, as outlined above, leveling blocks are usually preferable. Where the earth is self-sustaining, a foundation like that of Fig. 1 can (as is described below) be built without any forms by merely filling with concrete a rectangular excavation in the earth. Where the earth is not self-sustaining and forms are necessary, it is

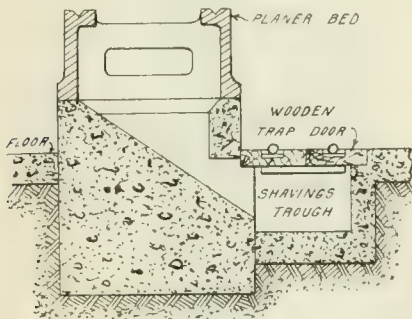


FIG. 13—ARRANGEMENT OF POCKET WHEN BASE OF BED IS RAISED ABOVE THE FLOOR

ordinarily desirable to provide a footing (Fig. 3) upon which the forms can be erected under every foundation.

A Foundation for a Planer With Legs is detailed in Fig. 8. In constructing this the hole was excavated and the bottom filled with a slab of concrete which provides the footing and which distributes the weight over a wide area so that settling will be a minimum. Then on this footing the forms were erected for the piers, which extended almost to the floor level. On the top of each pier the leveling blocks were set in grout, as indicated in the diagram.

Apparently the reason why the foundations have been constructed in this manner is so that the foundation will at no point extend beyond the outline of the planer bed except at the location where the leveling blocks are to be placed. The appearance of the resulting foundation is very satisfactory, but it hardly seems that it would earn greater dividends than one built in accordance with the simpler scheme shown in Fig. 2.

A Straight-Sided Foundation for a Long Planer is delineated in Fig. 2. In this design simplicity is the keynote. The cost of the forms and of the foundation itself will be a minimum and at the same time the structure has an attractive and business-like appearance. Note that offsets, pockets, angles and inclined surfaces have been avoided in so far as possible.

Steel Reinforcing may often be used effectively as suggested in Fig. 9. There may always be some tendency for long narrow foundations such as those that are necessary for long planer beds, to deflect in about the same way that a beam deflects. This is particularly true if the soil at the middle or the ends of the foundation yields. Just as a concrete beam may be reinforced with steel rods so can one of these foundations be reinforced as indicated in the diagram. With a beam, however, the load is always imposed from the top, while the ends of the beam are supported. Hence, the top of a beam is always in compression while the bottom is in tension, but with a planer foundation either the top or the bottom may be in tension. If the earth under the centre of the foundation settles the bottom of the beam will be in tension, whereas if the earth at the ends of the foundation settles the top will be in tension. For these reasons it is well to locate reinforcing steel rods both near the top and near the bottom of the foundation. For reinforcing steel pieces of light rails, pipe or rods—scrap material is entirely satisfactory—can be utilized.

The Height of the Planer Table Above the Floor is a thing which must be de-

termined on the basis of the work which the planer is to do and the size of the planer. The table of a large planer should not be as far from the floor as that of a small one because the machinist has little difficulty in seeing the top of any piece of work on a small planer but, on a large planer, where the castings being machined may be a number of feet high, it is desirable to arrange the foundation so that the planer table will not be too far from the floor. By following this procedure the use of a step-ladder by the machinist so that he may see the top of his work may, in many cases, be avoided. No rules which apply generally can be given. It is, however, usually considered good practice to locate the planer tables about the distance from the floor shown in Fig. 10.

The Proper Depth for Planer Foundations is always a thing which must be determined by local conditions. As a general rule, however, it is not necessary or desirable to make any planer foundation deeper than about 5 feet if good solid "bottom" is found at this depth. On the other hand any foundation should, unless its footing is extended over a relatively large area, extend down

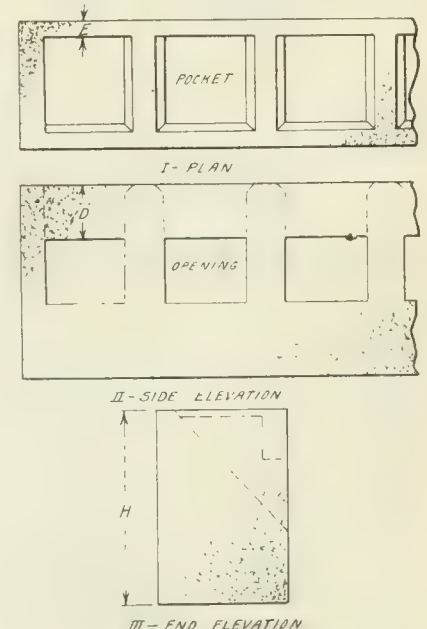


FIG. 12—SIMPLIFIED VIEWS OF A POCKETED FOUNDATION WHEN THE BASE OF BED LIES BELOW THE FLOOR LINE.

to "good bottom." The foundation for a small planer need not, in good soil, be deeper than a couple of feet. In filled ground trouble is liable to be encountered unless the above precautions are rigidly observed.

The Area of Base Necessary for a Planer Foundation depends upon the character of the soil. In good solid earth it appears that it is seldom, if ever, necessary to have the area of base of the foundation greater than the area of the base of the planer bed. However, spread footings are often used merely because of the convenience in form construction which they afford. That is, under such conditions a foundation like that of Fig. 1 with perfectly straight sides will suffice. Where it is deemed

desirable because of poor soil to increase the area of base, this can usually be best accomplished by putting a spread footing under the foundation, as suggested in Fig. 2.

Shaving or Chip Pockets* May be Provided in Planer Foundations as suggested in Figs. 11, 12, 13 and 14. Such pockets provide a recess into which the chips brushed from the planer table may fall and from which they can be shoveled without sprinkling them over the V ways in the planer bed. Where the planer foundation does not extend above the surface of the floor the construction detailed in Figs. 11 and 12 may be

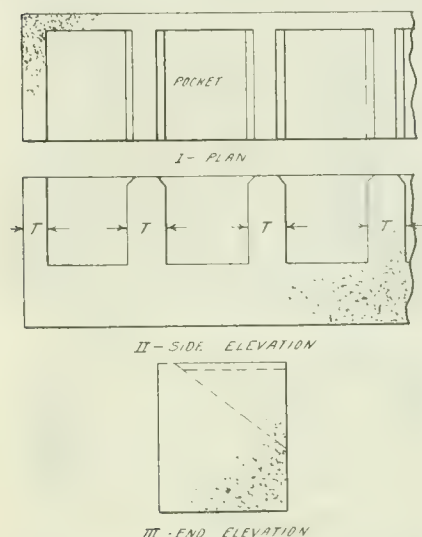


FIG. 14 - SIMPLIFIED VIEW OF A POCKETED FOUNDATION FOR A PLANER WHEN THE BASE LIES ABOVE THE FLOOR LINE.

adopted. There is a pocket P, with an inclined face under each opening in the planer bed. Along the side of the bed a trough W extends. The chips drop from the pocket into the trough. A wooden trap door D is provided over the trough. At the end of each day's work the door, D, is taken up and the chips which have been accumulated are shoveled out. Such provision will more than pay for itself for two reasons. The first is that the ways of the planer are protected from the sprinkling of chips which might occur if it was necessary to remove the chips from the recesses in the bed with a shovel. Second, the chips can be removed from the trough W, at almost any time, even when the planer is running, so that overtime need not necessarily be involved. Where the planer foundation extends above the surface of the floor the construction outlined in Figs. 13 and 14 may be used. With this construction there is no possibility of tools or small parts which might be lying on the floor being kicked into the shavings trough.

*This method of providing chip pockets in planer foundations applies particularly when the table has the stop-pin holes and the bolt holes passing entirely through it so as to permit the chips to fall through the table into the bed. The tables of some planers are so designed the chips may pass through the upper part and be taken out of the side of the bed, in which case the bottom of the bed may have no holes through it. With such construction, chip pockets are, obviously, unnecessary.

A Foundation May be Built Without Forms in soil which is self-supporting. In such a soil it is merely necessary to excavate the hole of the size desired and fill it with concrete as suggested in Fig. 15. If a spread footing is necessary this can be made by under-cutting with a shovel around the bottom corner of the excavation as shown at A, B, C. Where the soil is not stiff enough to support itself, forms for the foundation are necessary.

Methods of Saving Concrete in Planer Foundations are shown in Figs. 15 and 16, in both of which illustrations the foundation is made hollow so that the total volume of concrete required is very much less than would otherwise be necessary. In Fig. 15 old barrels, laid end to end, are placed in the foundation providing the form for a sort of double arch. The barrels are, of course, buried and left in the concrete. In Fig. 16 a form, which may remain in the concrete, is erected to provide the hollow space or tunnel within the structure. Another scheme for saving concrete which may often be utilized effectively is to fill the interior of a foundation with large boulders or rocks. If such boulders are carefully placed so that there is concrete between them the resulting construction will be about as effective as if the foundation were of solid concrete.

Forms for Planer Foundations may be constructed in accordance with the general plan outlined in Fig. 16. The hole was first excavated and then the concrete for the footing, M, N, O, P, is poured. On this footing the forms are erected. The vertical pieces, P and F may be held by stakes driven into the earth and by blocks, B, wedged in be-

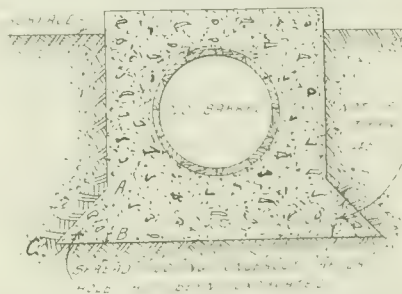


FIG. 15 - SHOWING HOW TO SAVE CONCRETE WITH OLD BARRELS AND HOW TO UNDER-CUT FOR A SPREAD FOOTING.

tween them and the vertical surfaces of the excavation. The form boards are then nailed to the verticals as shown. The form for the hollow centre Q, R, T, U, is, if such is to be used, now erected. Finally the concrete is dumped into the remaining space.

EXPERT KNOWLEDGE

By A. L. Haas

Knowledge is commonly supposed to be power and for this reason should carry payment.

A story which enforces the point at

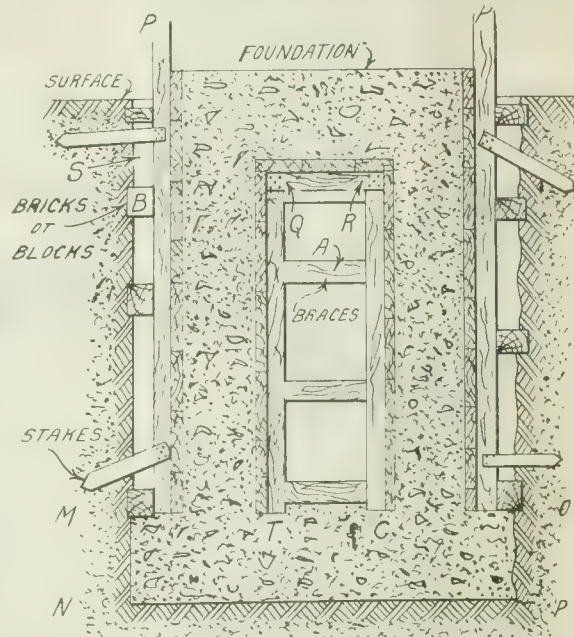


FIG. 16 - FORM CONSTRUCTION FOR A PLANER FOUNDATION OF CONSIDERABLE DEPTH SHOWING METHOD OF SAVING CONCRETE BY MAKING FOUNDATION HOLLOW

issue was related to the writer by a friend whose fund of mechanical experience is extensive and peculiar.

A colliery of an out-of-date type had as a part of its equipment an antique beam engine. One day this pulled up and in spite of all coaxing refused duty. The former engineer living retired in the vicinity was sent for in the emergency; he disappeared into the cloud of steam and inside half an hour the accustomed beat of the engine again became audible. "Send in your bill, Jack," was the relieved manager's parting salutation.

When tendered the bill read:—

To starting up engine...£5 0 0

The manager objected to the amount when he ran across the old man the next day. "Ten bob would have been ample for the time you put in," was the manner of his protest. "Send in another bill."

The second claim read thus:—

To time starting up engine...£0 5 0

Knowing how...£5 0 0

Total...£5 5 0

The bill was paid.

Washington, D.C.—It is now definitely stated by the U. S. Government, through Bainbridge Colby of the Shipping Board, that the proposed transfer to a British Syndicate, of ships under British registry, will not be allowed. The Government have offered to take these vessels over on the same terms as offered by the British Syndicate. The vessels involved aggregate 730,000 gross tons, including some of the finest transatlantic liners.

The Use of Ball Bearings for Electrical Machinery

Advantages of Ball Bearings—Enable the Builder to Use a Smaller Air Gap—Better Commutation Due to Greater Precision—Enhanced Efficiency Over Plain Bearing—Dimensions Smaller

By H. M. TRUMBULL

INDUSTRIAL operations are carried on for profit, and profit depends upon the difference between selling price and cost. This difference, due to the events of the past few years, has been steadily decreasing—especially in the manufacture of electrical machinery. For, on the one hand, the cost of all raw material has been advancing, as has also the cost of labor and the expense of marketing the product; on the other hand the manufacturers of electrical machinery, because of keen competition in this line have not deemed it expedient to advance their selling prices in proportion to the increasing costs. The service rendered by electrical machinery produced by the various manufacturers is so nearly identical that no one company has considered it wise to take the initiative in marked advance of selling price. Such conditions might soon prove disastrous and so each manufacturer has been endeavoring to incorporate in his design some material improvement which will net the customer a present and ultimate economy and induce him to pay an increased first cost.

Almost simultaneously many of the manufacturers have answered this ques-

of using ball bearings on electrical machinery has been the subject of discussion by engineering societies both in this country and in Europe, but now this question has been taken out of the realm of discussion and made a cold dollars-and-cents proposition.

Not only has the incorporation of ball bearings in motors and generators lessened the selling expense for the manufacturer and allowed him to charge a higher price, but it has also offered such economies to the user of these machines that the higher initial cost has been much over-balanced and additional profits made possible. In fact, progressive mill owners, mine superintendents and shop managers all over the country, who are facing the same problems of advanced costs of materials and labor, are forced to introduce better machinery and to grasp every opportunity for completing a manufacturing operation in less time and at a decreased expense, and so they are specifying ball-bearing equipment.

In order to obtain an ideal of the advantages of the application of ball bearings to electrical machinery, a series of questions was recently submitted to motor-manufacturing engineers and users of ball bearings throughout the country. A careful analysis of the replies, giving the tests and experience of motor designers and users shows the following advantages in favor of ball bearings.

Maintained Air Gap

Among the principal advantages of ball bearings on motors are their precision and freedom from wear. The bearing adjustment remaining constant keeps the rotor in the center of the magnetic field. This permits the motor manufacturer to employ air gaps with clearances so slight that they could not be considered on motors having any other type of bearing. On induction motors a close air gap is of vital importance in the improvement of the machine efficiency and the power-factor.

Chief among the difficulties with plain bearings is the fact that after a period of service the bearings wear down to an amount varying with the load and service conditions. If this wear continues it will finally permit the armature to touch the pole pieces with resulting trouble—perhaps a stripped armature.

In a ball bearing, hardened steel balls roll on hardened steel bearing races; thus rubbing friction is practically eliminated and accuracy is maintained.

On axle-driven generators used for railway car lighting, the bearings must maintain the air gap or a stripped



DIEHL TYPE K ADJUSTABLE SPEED INTERPOLE MOTOR FOR OPERATING STEERING GEAR ON SUBMARINES.

armature results. Ball bearings have replaced plain bearings for this service almost entirely because of the greater dependability attained. Records of 200,000 car-miles, where ball-bearings are used, have become common in spite of the frequently excessive tension of the belt. The shock and distorting action on the shaft due to crossovers, switch frogs and uneven track, the snap of the generator belt when flying ballast is picked up and passes between the belt and pulley, all deflect the armature shaft. It is found that self-aligning ball bearings accept these shaft deflections without binding or wear.

Improved Commutation

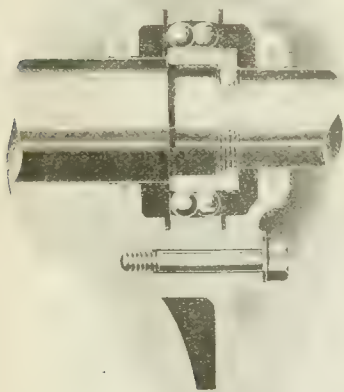
On direct-current machines, the fact that ball-bearing heads are sealed so as to prevent the escape of lubricant keeps the commutator clean. Commutators are thus protected against a conducting "slop" of dust and oil, and good commutation is maintained.

Precision and durability of bearing setting also insure better accommodation.

Freedom from sparks from the commutator in flour mills, in coal mines, in textile mills, in woodworking plants, or wherever there is combustible dust, reduces the possible danger of ignition or explosion, thereby materially decreasing the fire and accident hazard.

Comparative Frequency

On motors in which the shaft is subjected principally to rotating action (torque), bearing friction is a very small percentage of the motor losses. This is the case in direct-coupled units, centrifugal pumps, motor-generator sets, etc. The bearings carry but little, if anything, in excess of the weight of the rotor; therefore pressure between shaft and



MOUNTING ARRANGEMENT WITH BALL BEARING ON MOTOR SHAFT.

tion by incorporating ball bearings in the design of their standard equipment. No other single improvement has been made in the last five years which has increased the ruggedness and economy of motors as much as ball bearings. This improvement has proven to be a sales advantage and ball-bearing equipment, because of its strong sales appeal, puts motor selling on a more profitable plane.

For a number of years the desirability

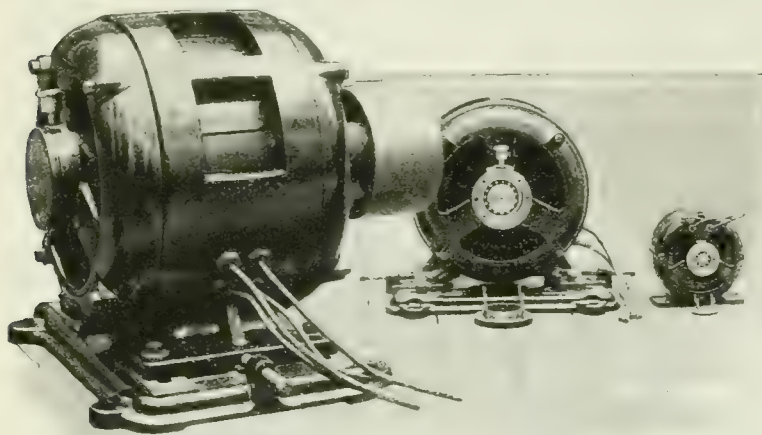
bearing lining is inconsiderable and bearing friction is a minimum.

Where the motor shaft is subject to bending action, however, bearing friction becomes an important consideration. This is the case with belt and gear-drive motors. The bearings are subject to

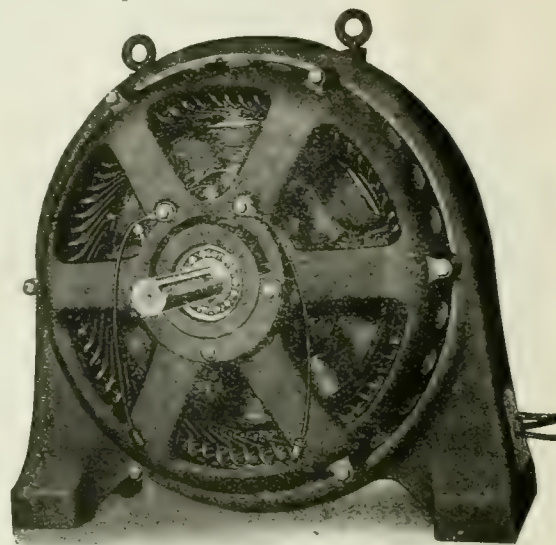
at its outside limits is one-half to one-third shorter along the shaft than the plain bearing for the same motor, with the result that the over-all length of motors can be reduced 10 to 27 per cent.

Simplicity and Cleanliness

The use of ball bearings reduces the head construction to its simplest terms. Instead of oil rings, chains, wicks, waste packing or other devices which are re-



ROBBINS & MEYERS CO. THE END CAPS OF THE TWO RIGHT HAND MOTORS ARE REMOVED TO SHOW BEARINGS



FAIRBANKS-MORSE MOTOR EQUIPPED WITH BALL BEARINGS.

severe bending, pounding or shock strains, especially at the driving end. Ball bearings in these cases show a decided saving over plain bearings. This is due to the fact that in ball bearings the friction is practically constant over a wide range of pressures, and because rolling is substituted for the rubbing action of plain bearings.

Compactness

Compactness is required in conditions usually found in general industrial applications for induction and direct-current motors. To get this feature of compactness, motor manufacturers develop the greatest possible horsepower from a given size of motor frame. This reduced size per horsepower capacity gives the greatest driving power in limited space conditions.

The length of the motor bearings affects the question of compactness to an important degree.

Babbitt bearings are usually designed with the box length two and one-half to three times the diameter of the shaft which they support. Contrasted with this, the length of ball bearings along the shaft usually is not over one-third of the shaft diameter. Surrounding the ball bearing is the lubricating chamber, which

by the employment of ball bearings.

Where a consideration of aisle room, floor space, machine arrangement, etc., is necessary, a ball-bearing motor goes a long way towards solving the problem, as shown in the following table:

PLAIN DIRECT-CURRENT MOTORS.

Size of Motor.	—Motor Length Over All—		Reduction in Length. Per Cent.
	Ring-oiler Bearing Motor. Inches.	Ball-bearing Motor. Inches.	
5	26 1/8	23	12
6	26 7/8	24 1/4	9.8
7	31 11 16	26	18
8	35 1/2	29 1/4	16.2
9	38 7/8	32 1/8	17.4
10	41 9 16	34 1/4	17.6
11	45 1/8	37 7 16	18.4
12	49 1/8	38 3/4	22.4

INTERPOLE MOTORS.

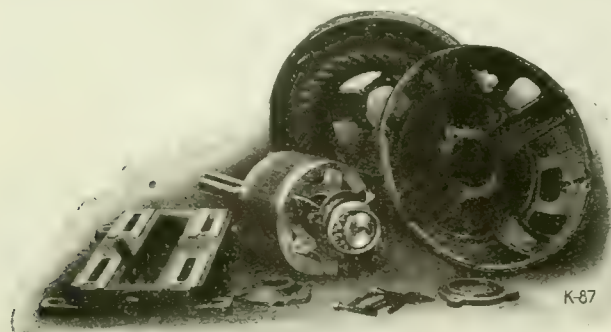
Frame Size.	—Motor Length Over All—		Reduction in Length. Per Cent.
	Ring-oiler Bearing Motor. Inches.	Ball-bearing Motor. Inches.	
1 1/2	18 1/8	16 1/4	13.9
2	20 15/16	18	14
3	23 7/16	19 7/16	17
4	25 1/8	19 3/8	21.8
5	28 1/8	22 1/8	21.2
7 1/2	33	25 9 16	22.6
10	37	28 3/4	22.3
15	43 1/8	33 1/4	22.9
20	45 1/2	33 3/16	27.1
25	45 3/8	37 3/4	17.3
30	51 3/8	38 1 16	26
40	53 3/16	41 3/8	22.2
50	57 1/8	42 13 16	25

quired for plain-bearing motors, ball bearings require no oiling devices other than the ball bearing itself. Ball bearings are in themselves positive self-lubricators. Instead of necessitating frequent inspection of the bearings, renewal of the lubricant and possibly occasional rebabbiting, ball-bearing motors require no attention other than periodic lubrication—the length of time between inspections being from one week to six months, depending upon the service.

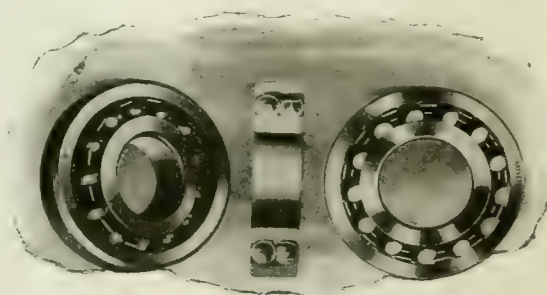
Ball-bearing motors are clean. The ball bearings are encased within bearing heads with sealing grooves on each side of the bearing, preventing the leakage of lubricant. With this protection, dripping or leaking of oil is eliminated and there is no danger of goods becoming soiled or contaminated with oil from this source.

Gear-Drive Motors

Where gear drive is used, ball bearings on electric motors are of particular advantage. In order that gears shall run smoothly and quietly, the proper distance between pinion and gear centers must be maintained. It is a fact that noisy, chattering gears may be caused by wear having taken place in the bearings supporting the gears. After long service



DISASSEMBLED VIEW OF MOTOR SHOWING BALL BEARINGS.



SKF RADIAL BALL BEARING SHOWN IN NORMAL POSITION AND IN DEFLECTED POSITION.

with this type of drive, ball bearings show no appreciable wear and consequently the gears mesh properly, giving longer and better service.

Plain bearings must be designed so that the pressures are well under the limit for the corresponding speed of the bearing. To reduce unit pressure in the

Ball Bearings on Axle Generators

Ball bearings are now used almost exclusively on axle-driven generators for railways. A few years ago these machines were equipped with plain bearings. The service is so severe, however, and the attention which can be given is so small, that ball bearings have proved

inspection of one of the largest railroads in the country is eloquent with the advantages of ball bearings on these generators. He says, "The cost of generator maintenance has been reduced—on coaches, 66 per cent.; on diners, 46 per cent. We have never had a hot bearing, have not lost any fields or armatures, the inside of the generator is dry, and we have no trouble due to grounds or short circuits." This is typical service where self-aligning ball bearings are used.

The Lubrication Problem

Ball bearings offer the motor user one solution of his lubrication problem. The ball bearings are contained within simply constructed bearing-head brackets with liberal lubricant chambers which are sealed on both sides and by end caps. These end caps are fitted close to the motor shaft and are practically proof against leakage of lubricant, as well as the intrusion of moisture, dust, lint, grit

bearing surfaces, it is necessary to increase the rubbing area. This may be done in either of two ways:

First, by increasing the journal length. This of course offers the disadvantage of increased floor space required by the motor, and where compactness is a desirable feature this is a serious handicap.

Second, by increasing the shaft diameter. Increasing the diameter increases in direct ratio the speed of the rubbing surfaces which should be kept as low as possible, because each increase of rubbing speed directly increases the likelihood of hot bearings. Larger shafts also mean heavier and more costly motors.

Whether, therefore, the bearing length or the shaft diameter be increased, the plain bearing is confronted with positive limitations.

Ball bearings are designed for high speed and heavy loads. The housings are short and the motor on which they are used may be made very compact. Because of the compact construction the distance between the bearing and pinion is reduced, hence the overhung load on the bearing is proportionately reduced.

to be the only equipment that will "stand up."

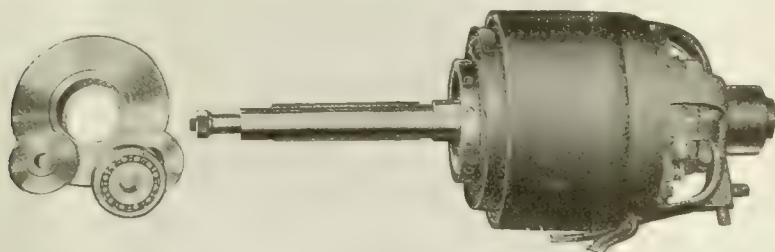
The generators are exposed to snow and ice, heat, dirt and water, the jolts

and shocks of passing crossovers and switches, and the continual jar of heavy truck suspension. These conditions all play havoc with plain generator bearings.

The testimony of a superintendent of

or other foreign substances from without.

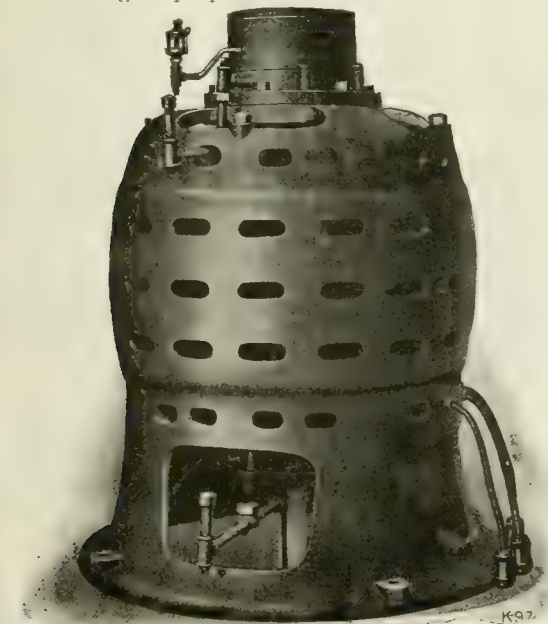
Ball bearings are positive self-lubricators. The ball spacer or retainer is of such construction that the bearings are open at the sides, thereby giving free circulation of the lubricant in the ball



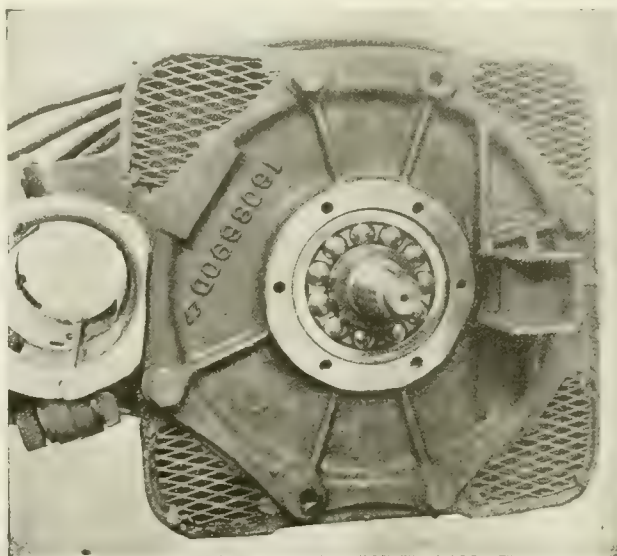
BALL BEARING USED WITH VACUUM CLEANER.



CHARGING MOTOR GENERATOR FOR STORAGE BATTERY WORK. EQUIPPED WITH BALL BEARINGS.



FAIRBANKS-MORSE VERTICAL BALL BEARING INDUCTION MOTOR.



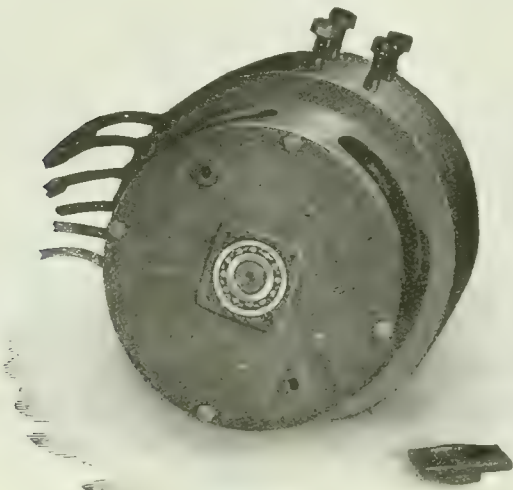
GENERAL ELECTRIC TRACTION MOTOR

paths: Oil rings, chains, or similar rotating oiling devices are done away with entirely and positive, thorough and uniform lubrication is assured.

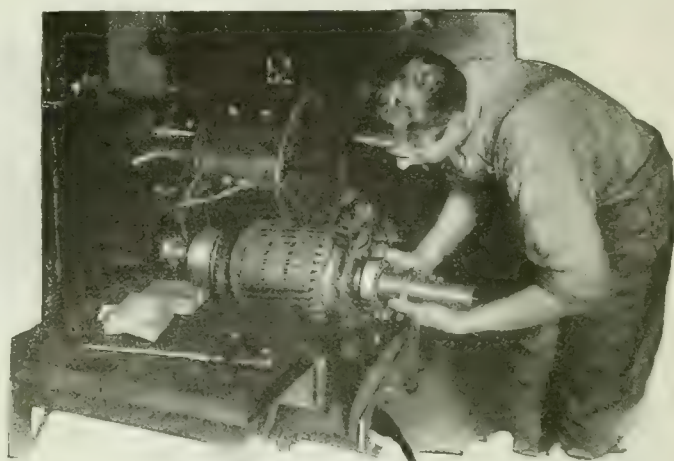
It will be readily appreciated from the use of ball bearings on motors that:

modities which have been procured either wholly or nearly so from abroad. To deal with this duty effectively the Department has been subdivided into numerous sections, each dealing with only particular articles or groups of allied

uation in that country industrially. In the first place the high cost of raw material which prevails at present, and the uncertainty of many things, make the manufacturers hesitate about going ahead and putting up large stocks of



A 24-VOLT, 10-AMPERE VEHICLE-TYPE MOTOR.
MANUFACTURED BY THE DIEHL MFG. CO.



INSTALLING BALL BEARINGS ON ARMATURE SHAFT OF MOTOR.
MANUFACTURED BY THE ECK DYNAMO & MOTOR CO.

1. They eliminate the frequent troublesome inspection of plain bearings—the user need not concern himself as heretofore about the possibility of oil rings sticking.

2. Motors equipped with ball bearings are free from the nuisance and dirty conditions caused by creeping oil and dust around the bearing heads. Frozen bearings due to oil or lint or draining of the oil reservoirs are practically eliminated. Security against such conditions in many instances is worth the cost of the motor and is particularly valuable in textile mills, flour mills, woodworking plants, or other places where dripping oil adds to the fire hazard or, is ruinous to stock in process.

Briefly summarizing the economies offered by ball bearings:

(a) Smaller air gaps permissible, because ball bearings will not wear down as plain bearings do. This gives an improved power-factor for induction motors.

(b) Danger of armature touching the pole pieces is eliminated.

(c) Leakage of oil is prevented. Thus oil cannot drip on to the commutator or oily dirt collect, causing flashovers.

(d) Over-all length decreased from 10 to 20 per cent, resulting in a more compact motor.

(e) Longer period between motor inspection and lubrication required—once in six months against once in two weeks with plain bearings.

(f) Fewer repairs and decreased maintenance cost.

(g) Improved motor commutation.

(h) Improved efficiency, because of reduction in bearing losses.

PRECISION TOOLS

The British Ministry of Reconstruction is hard at work on the great task of making Great Britain self-supplying in a number of important com-

articles, and placed under the direction of an expert. One subject which is engaging attention at present is that of engineer's fine tools, which is taken to mean the various Precision tools used in engineering work. These in the past have come mainly from the United States, and to a lesser extent from Germany, and France, and they include instruments and gauges measuring accurately up to ten-thousandths of an inch. The value of the imports of these goods has reached several hundred thousand pounds per annum, and as regards the majority of them, no serious attempt has yet been made to produce them in Great Britain.

It is the object of the Department to promote the home manufacture of as many of these tools as is possible by those who are already making gauges of various kinds. Some people are dubious as to the ability of this country to supply the goods at any rate, on a competitive basis. They say that among other things England lacks a supply of young mechanics thoroughly trained in carefulness and accuracy in their work, and also that to produce at competitive prices the large plant necessary could not be kept going unless a world-wide trade was done. Nevertheless the attempt is being made, and if it succeeds only partially it will have been justified. Splendid work in the making of screw gauges is being done in the engineering department of the Sheffield University, and on quite a large scale.—By M. M.

INDUSTRY IN THE UNITED STATES AND CANADA

Speaking of conditions following war contracts, a gentleman who is very closely in touch with the situation in Canada and the United States, gave his opinion as follows:

"I believe the U. S. government is in somewhat of a quandary over the sit-

anything, and even if they decided to stock up, the merchant would naturally hesitate about laying up stocks at the high figures that the manufacturers would have to sell at. The solution of the high cost problem would seem to be in reduced cost of labor, but in that connection our friend, Samuel Gompers, sounded the warning note the other day when he told the 'Bourbons of Capital' that the workmen would not be content with decreased wages and lengthened hours. I believe the hesitation of the United States in cancelling munitions contracts is caused by a reluctance to throw labor on the market in large quantities with insufficient capacity for absorbing it. The solution for the moment at least would seem to be coming from the reconstruction work that is expected in the United States and Canada from devastated European countries, and efforts are undoubtedly being made to secure some of this before the munitions contracts are entirely cancelled. A conflict between capital and labor, to say the least, would be unfortunate at present. Throwing a large amount of labor on an unprepared market could only result in lowered wages and consequent reduced costs, and while that would eventually work itself out, the result would be obtained only through intense suffering and privation on the part of many of our people. On the other hand, the demands of labor for war-time wages in a period of peace might result in the withdrawal of capital and consequent stagnation. Undoubtedly many powerful brains are at work on the problem to-day, and it is intensely interesting from all points of view."

A new 'high-pressure' central steam supply plant is being built in New York. The steam is delivered for power purposes to office buildings and factories at 125 lb. pressure per square inch.



WELDING AND CUTTING



Notes on Regulations for Arc Welding

In a Paper Read Before the I.E.E. the Author Points Out a Number of the Precautions to be Observed in Arc Welding For the Safety of the Operator and the Effects of a Welding Load on the Supply Mains of the Power Station

By H. M. SAYERS.

ELECTRIC arc welding has recently come into use for a variety of purposes and shows promise of extensive developments. The practice at present is mainly empirical. In view of the possibilities of its application to ship-building, one of the Admiralty Departments has set up an Electric Welding Research Committee, including a number of unofficial members representing important interests who offered to render voluntary assistance in the development of electric welding.

One of the points which has come before the Committee is the question of establishing rules in respect of (a) safety of operators, (b) conditions of supply; and it has been thought essential to have a discussion in order to get the views of members of the Institution on these matters.

A very large and influential Research Committee has been formed in the United States. It is communicating all its proceedings and reports to the Admiralty Committee, and among them the discussions and reports on regulations.

The Admiralty Committee has already drawn up a skeleton form of regulations based on experience in Great Britain and the communications from the United States, which are set out below.

This paper is therefore brought forward to introduce a discussion, and to set out the points as they at present appear to arise in practice in Great Britain.

Welding Regulations

It may be said that arc welding has been in use for over 20 years, but its extension to heavy work and the use of metallic electrodes are of more recent date.

Necessary regulations are conveniently divided into two heads:—

(1) Regulations affecting the safety of operators and workers in their vicinity.

(2) Regulations affecting the reliability

and regulations of general supply systems.

Taking the first heading, there are two main points:—

(a) Protection of operators and neighboring workers from the effect of the radiations from the arc.

(b) Protection from shock.

(a) Protection from radiation.—Under the first heading it is well known that the light from a naked arc has a serious effect upon the eyes and the skin. This is more serious with the iron arc than with the carbon, as the iron-arc radiation is richer in rays of short wavelength, including ultra-violet rays, which are specially detrimental. Welding arcs require large currents, e.g. a No. 10 welding rod requires up to 120 amperes, and as the extension of the arc to heavier work is clearly foreshadowed, arcs carrying several hundred amperes have to be reckoned with in considering protective appliances.

Where welding is carried out in a factory under stationary conditions the provision of screens, masks, etc., for the welders can be readily arranged, and each operator's position can be isolated from neighboring workers by suitable screens.

More difficulty arises in such work as welding the hulls of ships, where the welders must work on stages; and most, perhaps, in repair work, such as is carried on in marine and other boilers, ship spaces, etc.

The object to be attained in every case is, however, that arc radiations shall not reach the eyes or skin of either the operators or persons in the vicinity, except through screens which obstruct the injurious rays.

The welder himself and any assistant must be able to see his work, and it is therefore necessary that such screens as they use shall be reasonably transparent to ordinary light. It has to be remembered that the skin of the hands, arms,

face, and neck needs protection. This can be given by any opaque material. Glass can be obtained which is practically opaque to the most injurious rays, and yet fairly transparent to ordinary light. Combinations of colored glasses are also in use, which are fairly satisfactory. The U.S. Research Committee has recommended certain combinations of this kind.

It is clearly important that the screen or mask used shall be such as not to restrict the operator's movements or to cause a discomfort. Goggles protect the eyes only. Masks are in use which protect the face as well, but masks are open to objection on the point of comfort. A screen held in the left hand carrying a sufficient area of suitable glass, and an apron to shield the left arm, are satisfactory for stationary work. It may not prove so good for ship-building and repair work where the left hand may be required for other uses.

There is no doubt a danger radius from an arc of given power, beyond which no screening is necessary in respect of eye and skin protection. But intense lights within the usual field of vision are objectionable in any working space, quite apart from directly injurious effects, so that the screening-off of welders in factories seems desirable in any case. In shipbuilding it is probable that whilst welding is in progress on any section all the near-by workers will be welders and their mates who will have their individual protection.

In repair work, especially in ship spaces, exigencies of time may require other workers to be employed close to the welders, and perhaps the only possible regulation would have to be in the general terms that efficient shielding from the arc must be employed in such cases.

It may be said that whilst the short-length waves are responsible for the

damage to the eyes, and some of that to the skin, the long-wave or heat radiations from powerful arcs also produce sunburn effects on the skin, which must be guarded against. This effect is, however, essentially of short range and mainly affects the welders themselves.

(b) Protection from shock.—The pressure across a welding arc is quite low. Both for direct and alternating-current arcs it is of the order of 25 to 30 volts. But there is always a steadying resistance or choker in series, and when the arc is broken there is the full supply of pressure on the electrode. It is at this time that there is more danger of shock both because of the higher pressure and because the electrode is not visibly dangerous. It may be laid on the bench or any other handy place and inadvertently touched.

It has to be remembered that in working from a stage, etc., the danger of shock is from indirect effects such as those causing a start or stumble, loss of balance. With d.c. arcs there need be no danger if the supply conditions are properly adjusted; 100 volts is the maximum supply pressure necessary either for carbon or for metallic electrodes, including steadying resistances, and 100 volts d.c. will not make a man start or stumble. Therefore, as regards direct-current welding, the maximum voltage needed is below the danger point, and it is only necessary to limit the supply pressure to some such figure as 100 volts. Even 200 volts (which it may be convenient to employ where welding is only done occasionally) can hardly be called dangerous.

In the case of alternating-current welding the conditions are rather different; whilst the actual arc voltage as shown by a voltmeter is quite low, 30-35 volts, practice shows that a considerably greater circuit voltage must be available. One manufacturer puts this at 110 volts. The minimum stated by another is 65 volts. This matter is under special investigation, and it need only be said here by way of explanation that an iron arc distorts the E.M.F. wave, giving a sharp rise at the beginning of each alteration. Presumably the supply wave must be able to give this peak much in advance of its own peak. It must meantime be accepted that at least 65 volts is needed for a.c. welding. This pressure is capable under certain conditions of giving a severe shock. A welder is certain to have his skin damp with perspiration, which is one condition favorable to a shock. Therefore, to touch a live electrode may have serious consequences, especially for a man working on a stag-ing.

A welder will normally wear a protecting gauntlet of leather, so that there is little risk of shock through the hands unless working in conditions leading to wetting of the gloves. It may perhaps be necessary to lay down the rule that for a.c. welding the gloves must be waterproof. The most likely chance of getting shocks seems to be when the

electrode is laid aside and the welder has his hands bare. It is suggested that this danger can be averted by a "no current circuit breaker in the circuit, which could be cut out by a pedal switch for the purpose of re-starting the arc. This "no current" breaker would serve another useful purpose in preventing the use of too long an arc, which makes bad work.

It is submitted that both for a.c. and d.c. welding the work should always be earthed, or connected to the earthed pole of the supply circuit.

It should be a rule that a proper hook or receptacle should be always provided for an electrode not in actual use, and should always be used. This guards against shock, burning, and unintentional short-circuits by contact with the work, and is as essential for work under temporary conditions, repairs, etc., as in a factory. Possibly this rule might dispense with the "no current" breaker in a.c. work. The flexible lead to the electrode needs a little consideration. It must necessarily be somewhat heavy in copper section. The insulating covering must be strong and flexible. Armouring is scarcely admissible on account of weight and stiffness. It should be readily detached from the connecting socket, for ease of exchange, and there should be a switch or breaker between the supply and socket.

The insulation of the flexible near the electrode holder is exposed to considerable heat, conducted and radiated. It must not be damaged by this heating.

The steadying resistances require just the same precautions as resistances for arc lamps, starting and regulating resistances, but as the currents are heavy and pass during the whole of the welding operation ventilation must be good. These resistances, chokers, etc., must be capable of carrying the short-circuit current without rising to a dangerous or destructive temperature. The design presents more difficulty in portable equipments for repair work, etc., than for stationary equipments. The matter only concerns safety regulations in respect to fire risk and accidental contact, and the same regulations as for other similar operations should suffice.

Supply Regulations

The conditions of welding are not favorable for direct supply from the mains of a supply undertaking. The maximum voltage needed, say, 100 volts a.c., down to 60 volts d.c., is considerably below most supplies. The condition that the work must be earthed is also objectionable from the point of view of a supply authority. Of course a higher supply voltage may be used by the simple expedient of using a larger resistance in the welding circuit, but this is wasteful and increases shock dangers. On the grounds of economy it is not likely to be used where welding is in constant or frequent use. The temptation to use it is strongest in works where welding is only done occasionally.

The cases of a.c. and d.c. supply differ materially. Where the general supply from the mains is direct-current it must be expected that the pressure will be 200 volts or over from each outer main to earth. This is much higher than needed, and it brings in a distinct danger of shock, besides being wasteful of energy. It can therefore be excluded from consideration for equipment in steady use. It will pay the user to put in a converting set yielding the desired voltage.

The case of occasional welding may need consideration. From the economical point of view it may pay the user to throw away 75 per cent. of the energy in resistance rather than incur the cost of a converting set. In such cases the safety arrangements must be similar to those provided for a.c. sets. The supply interests, it may be suggested, will be sufficiently protected by proving that the current taken shall be limited in the same way as to any other power circuit. It seems obvious that welding supply-circuits must be run separately from any others from the consumer's main fuses. It should be arranged that the work connection can only be made to the earthed lead of the supply. But it must be expected that the work will be earthed in many cases, and it is suggested that supply engineers should tolerate this with such reservations as to power to disconnect for testing purposes, etc., as they think necessary to protect their systems. The Board of Trade regulations will need an exception to be made in the same sense.

Where, as in most cases, motor-generators are used for supplying d.c. welding sets, the supply mains have better protection, the generators can have characteristics desirable for welding circuits, and the polarity of the electrode can be reversed for special work when desired.

Alternating-Current Welding

Owing to the cheapness and efficiency of transformers, it may be assumed that these will always be used between the mains and the welding circuit. From safety considerations alone these should be of the two-circuit type and have earth shields.

Where single-phase is given, the supply undertaking hardly needs special protection, excepting those common to other power uses. It may perhaps be thought advisable to require that part of the resistance in the electrode circuit shall be in the form of choking coils to limit the current on striking the arc, and on making accidental contacts between electrode and work which are virtually short-circuits.

Where the supply is given from a multiphase system, questions of balancing arise. Obviously the simplest connection is to put the welding transformer across one phase. If a number of welders are in use and they are equally divided between the phases, they will approximately balance each other.

A single-phase supply can be ob-

tained from either two-phase or three-phase systems, loading each phasing. With two-phase three-wire distribution a single-phase supply can be obtained from the two outers, giving 1.414 times the voltage of either phase. This can be transformed in a single-phase transformer to the welding pressure. Whilst this connection loads each phase equally as regards current, the resultant current is out of phase, lagging on one side and leading on the other, reducing the power factor and tending to unbalance the voltage on the two phases.

Alternatively single-phase current can be taken from each phase directly, and where a number of welders are in use this is the simplest and most satisfactory connection, the welders being equally divided between the phases. There is, of course, the probability that unequal numbers will be in simultaneous use on the two phases, producing some unbalanced load.

With three-phase distribution single-phase current can be taken from a three-phase transformer with its secondaries connected in a particular way. This connection gives currents largely out of phase in opposite senses in two of the windings, tending to unbalance the voltage and reducing the power factor.

Welders can obviously be fed from the separate phases, and if a fair number are distributed between the phases the resulting out-of-balance loads will be only those due to differences in the numbers in simultaneous use.

The whole question from the supply point of view is one of magnitude of the effect, having regard to the relative proportions of the welding load and the general load supplied by the power or substation affected. The provision of condensers or other corrective devices on the lagging-current phase may be worth while in large lay-outs.

At the present stage it seems premature to make definite regulations. Supply undertakers would be sufficiently protected by the provision that for welding plants above a certain capacity, varying with local conditions, the method of converting the supply shall be subject to their approval, which shall not be unreasonably withheld.

In both d.c. and a.c. welding the striking of the arc is potentially the short-circuiting of the leads. It is on a par with the starting up of a motor, but somewhat more favorable, inasmuch as when welding there must be a resistance in circuit and the current can be limited by providing some minimum resistance or choker which the operator's regulating switch does not cut out. Similar regulations to those limiting starting currents on motors will therefore suffice, with the simplification that where a number of welders are in use a single limiting device in the mains is all that is necessary to protect the supply.

About one hundred years ago American ships carried 90 per cent. of the commerce of the country, and to-day are carrying less than 10 per cent.

EFFECT OF IMPURITIES IN ACETYLENE ON THE COST AND QUALITY OF WELDS

By CHARLES BINGHAM.

THE chief impurities found in or accompanying acetylene are sulphur, phosphorus, silicon, and finely subdivided lime, which affect the quality of the weld, and hydrogen, nitrogen, and their compounds, and water vapor, which affect the cost of the weld by lowering the temperature of the flame, thereby slowing down the welding process and thus increasing the charge for labor, carbide, oxygen, and overhead charges. Occasionally other impurities are also found, but their occurrence is so rare that they need not be considered, states the author in a paper before the "British Acetylene and Welding Association."

Sulphur is found mainly in the form of sulphuretted hydrogen. Most of it is held in the sludge and in the water, but a part always finds its way into the gas and, unless removed, passes into the weld. Sulphur makes the steel or iron "short" or brittle. It is also one of the chief agents in the corrosion of metal pipes, faucets, etc. The quantity of sulphur compounds may vary from 0.1 to 2.4 per cent. by volume; the quantity always increases with an increase of temperature in the generator. Nearly all the sulphuretted hydrogen can be removed by a good water-scrubber; the remainder is easily removed by a chemical purifier.

Phosphorus attacks the metal work of the apparatus and when burnt in the form of phosphoretted hydrogen it is the chief cause of the unpleasant atmosphere often found in welding shops. It makes the weld porous and any that is present in the gas passes almost entirely into the weld. The quantity of phosphorus compounds in acetylene can be as large as 1.2 per cent. by volume. Phosphorus can be removed only by a good chemical purifier.

Silicon is usually found in the form of siliciuretted hydrogen. The gas may contain as much as 0.63 per cent. by volume. Nearly all purifiers that remove phosphorus and sulphur fail to remove silicon compound, but as yet no experiments have shown that the presence of silicon has a bad effect on the weld.

The temperature of generation influences considerably the quantity of finely subdivided lime carried by the gas. This lime dust passes freely through the water, but the quantity present is usually small and can easily be removed by any good chemical purifier. The effects of the lime dust on welds has not been carefully studied, but the dust frequently chokes the narrow passages of the blow-pipe and some authorities claim that this causes spitting of the blow-pipe.

A yellow, brown, or black patch in the sludge is a sure sign that the temperature of the welding part of the flame, that is, the inner cone, is being lowered by hydrogen, water vapor, etc. Water vapor is a most pernicious diluent. It is decomposed at the high temperature of

the oxy-acetylene blow-pipe, its decomposition requiring 2300 calories per cubic meter. At a temperature of 100 degrees F., the mere passing of the acetylene through the water will cause it to be saturated with about 5 per cent. of water vapor. Where there is no water-scrubber and the generator is overtaxed, it is possible for a considerable percentage of the vapor to reach the blow-pipe nozzle before it has been able to cool sufficiently for any condensation to take place. Even where a water-scrubber is used the acetylene will be saturated with water, and the higher the temperature of the water the higher will be the percentage of the water vapor.

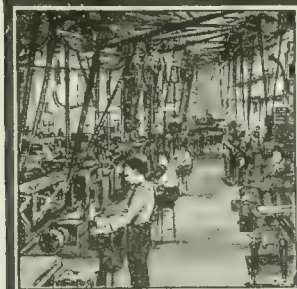
Essential Factors in Oxy-acetylene Welding

Carbide expands to about twice its volume when decomposed; if there is not sufficient space for it to swell freely, overheating and partial decomposition of the acetylene follow. This is also accompanied by over-production of water vapor. To produce the best results, the generator should produce acetylene at as low a temperature as possible; the temperature of the gas and water in the holder should not exceed, by 30 degrees F., the temperature of the air. The acetylene should pass through an efficient water-scrubber, but the water in the scrubber should not become too warm and should be frequently changed so that it will not become saturated with ammonia or sulphur compounds. The chemical purifier provided for removing phosphorus and sulphur compounds must, also, be regularly renewed or regenerated. The gas must be dried. An efficient method of doing this is to pass the gas after it has gone through the water-scrubber, through a vessel containing live carbide. The moisture in this case will produce additional acetylene which will be practically dry.

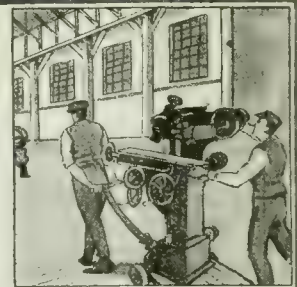
WELDING CAR AXLES

The price of car axles has increased about 250 per cent. during the past three years, and deliveries are now very uncertain; hence broken axles should be welded whenever possible. By the electric arc method a good man can prepare and weld two 4-inch axles per day; the cost of a finished reclaimed axle is only about one-third that of a new one.

The axle is burned off by the arc to V shape, 5 or 6 inches inside the wheel fit so that only good "live" metal is used in the reclaimed axle. Two prepared pieces are laid in an angle iron with their V-ends together. They are then welded together, using a carbon electrode and cold rolled steel as filler. After the weld is partly completed the axle is rested on a simple trestle and filling-in is completed. The axle is then cut to length and machined. The weld comes nearly in the centre of the completed axle.—R. H. Parsons, "Electric Railway Journal."



DEVELOPMENTS IN SHOP EQUIPMENT



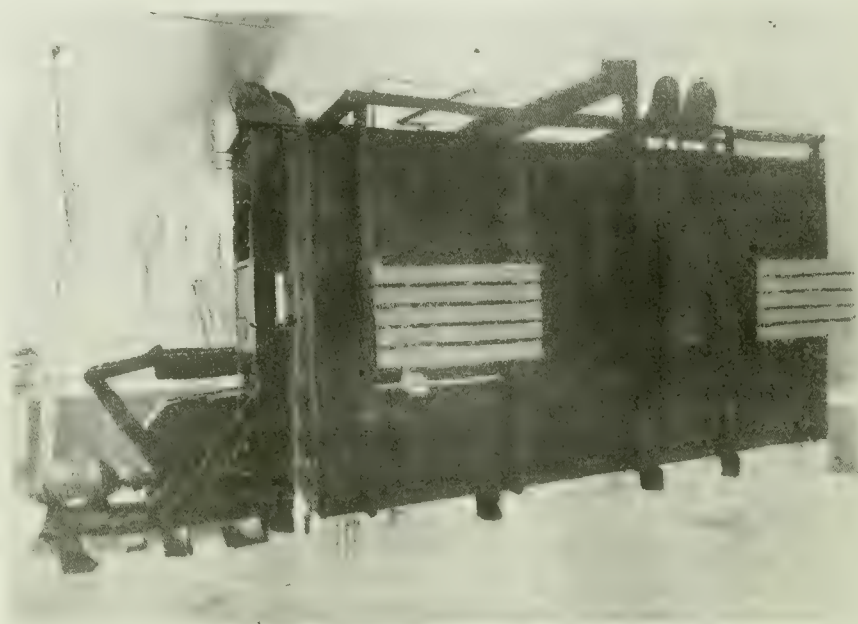
Makers of equipment and devices for use in machine shop and metal working plants should submit descriptions and illustrations to Editorial Department for review in this section.

ELECTRIC FURNACES FOR HEAT TREATING

AMONG the many developments directly traceable to the war is the use of the electric furnace in the heat treating of shells, automobile and aeroplane parts. This development is readily adaptable to peace time industries and will prove an admirable method of securing heat for this purpose owing to the uniform temperatures obtained and the ease with which they may be controlled. The accompanying illustrations show one type of the Baily automatic furnace, designed for heat treating manufactured by the Electric Furnace Co., Alliance, Ohio.

In principle this furnace makes use of the resistance principle. The resistance elements, two in number, are contained in troughs of highly refractory material. In this refractory trough the resistance material, composed of broken carbon, is placed, forming contact with the electrodes at each end. The heat radiated from the resistors is transmitted to the articles to be heat treated by reflection from the roof and by direct radiation from the troughs.

The operation of the furnaces is entirely automatic, the parts to be heat treated being introduced into the furnace by means of an automatic pusher arrangement, and being removed from the other end at the same time. In the line drawing is shown a continuous automatic two-furnace equipment hydraulically operated. In the left hand furnace the parts are heated to the desired temperature and are then quenched and hard-



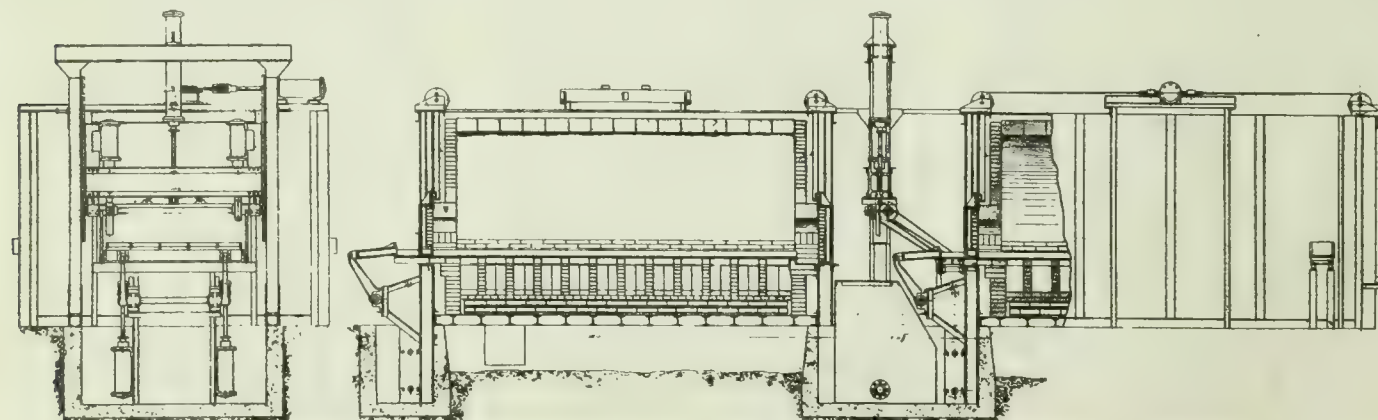
PUSHER TYPE FURNACE

ened in the quenching tank shown between the two units. From this tank they are automatically picked up and introduced into the drawing furnace where they are raised to the proper temperature for the heat treatment desired.

The temperature of the part to be hardened controls the automatic operation of the furnace as a pyrometer at the discharge end of the first furnace ac-

tuates the operating mechanism when the part nearest the discharge end reaches the proper temperature. This is done through a relay which operates a solenoid controlling the operating medium, hydraulic or otherwise.

Variations have been developed for the heat treating of cast steel anchor chain, the chain being fed in at one end of the two-unit installation and coming



CONTINUOUS FURNACE OF 500 K.W. CAPACITY FOR HEAT TREATING AEROPLANE CRANK SHAFTS, ETC.

out at the other heat treated in a very uniform manner. For castings and shapes too large to be cared for by the pusher type mechanism continuous recuperative furnaces are designed of the car type.

In size it is possible to build furnaces of such size as to take in, in a vertical direction, gun tubes and jackets, the quenching tank being made part of the furnace installation. Soaking furnaces for ingots are also made.

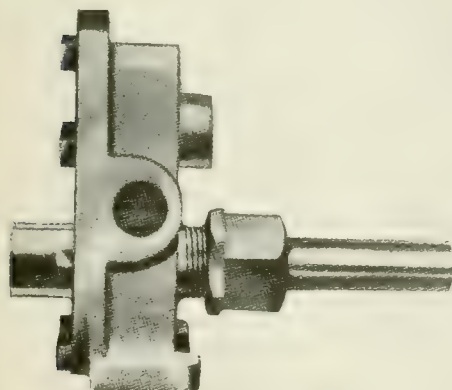
For the melting of brass a resistance type furnace has been built of the non-crucible type. A cylindrical shell is supported by the usual trunnions and brackets for tilting and has suitable walls and a roof of refractory material. The bottom of this chamber is so shaped as to make a bowl-shaped hearth for containing the metal when melted. The resistance element is contained in a circular trough of refractory material connected to the electrodes which are placed opposite each other.

The control of the current and hence of the furnace temperature and melting capacity is done by means of suitable voltage taps brought out from the secondary of a special transformer supplied with each furnace.

For the melting of aluminum a hearth type stationary furnace is used, and the accuracy of control achieved makes it an especially desirable medium for this work. Furnaces of this type are made up to 500 k.w. capacity and are capable of holding three or four tons of metal which are discharged by tapping. The enclosure is of sheet metal with high grade fire bricks as a refractory; heat insulating material is interposed for the reduction of radiation losses. There are doors at either end of the furnace and three rabbling doors on the side opposite the tap hole. These doors are heat insulated in the same manner as the body of the furnace. Those at the ends are opened and closed by sliding up and down vertically, being actuated by compressed air. The rabbling doors swing open on hinges. When running continuously a furnace of this size can melt one ton per hour and has a daily capacity of twenty tons.

BRONZE GEARED PUMPS

The Bronze Geared Pumps, manufactured by the Oberdorfer Brass Co., Syracuse, N.Y., are admirably adapted to



BRONZE GEAR PUMP

the handling of small quantities of liquids, which have to be moved in a steady and reliable manner. They find considerable use in connection with the water and oil circulation on gas engines, and are found in homes for supplying water, in factories for pumping water, lubricating and fuel oils; in various industries for pumping vinegar, wines, spirits, etc.

These pumps are simple and durable in construction and consist of the smallest possible number of moving parts. The housing and gears are cast of bronze perfectly adapted to the purpose. Tobin bronze is used in all shafts in place of steel. Brass screws are used for securing the cover plate through the body so that there will be no rusting or corrosion. All parts are carefully machined and are perfectly interchangeable. The impeller shafts are provided with a packing gland secured by a lock nut. Every pump is tested before being placed in stock. None pass inspection unless they show the proper pressure on discharge, and must raise water three feet without priming. Various types and sizes of these pumps are made so that any possible condition which will likely be met with may be supplied out of stock.

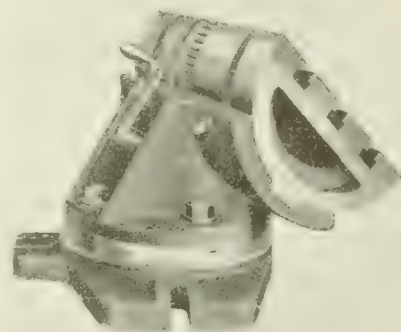
In many installations in which is required a varying quantity of liquid under a constant pressure as the pumping fuel oil to several burners or a constant quantity of liquid under a variable pressure as forced lubrication to several bearings, an unloader or other means of relieving an excess pressure is necessary. In pumps for this work this is accomplished by the placing of an unloader in the cover plate of the pump. The inlet pipe is connected from the supply to the pump in the usual manner, and the discharge is connected from the pump to one or more points, as desired. When the pump is started and its outlets are entirely or partially closed so that the pump cannot deliver liquid equal to its capacity, a pressure is built up in the line from the pump to the point of discharge. The pump, however, is provided with a relief valve or unloader, which can be set for any pressure desired in this line, and when the pressure exceeds the amount the surplus liquid is then bypassed and circulates within the pump itself. The pressure on the discharge line is, therefore, constant for any discharge from nothing up to the capacity of the pump. No return pipe is required to take the surplus back to the supply tank.

UNIVERSAL ANGLE PLATE

The inaccurate and make-shift rigs so commonly seen in machine shops are fast giving way to more modern methods of holding work while being machined. The universal angle plate shown herewith is made by the Boston Scale and Machine Co., 100 Ruggles St., Boston, Mass. By its aid any plain milling or grinding machine may be converted into a universal tool and the drill press may be made much more flexible. With a proper set-up it is possible to drill all

the holes in the majority of pieces of work without removing the work from the angle plate no matter what relation the angles of the holes bear to one another.

This device is particularly adapted to the tool room and used in connection with a grinder, formed cutters can be ground on it by the addition of centres to the platen. It has a motion through 360 degrees horizontally and 90 vertically. It can be quickly adjusted to any angle without disturbing the work bolted



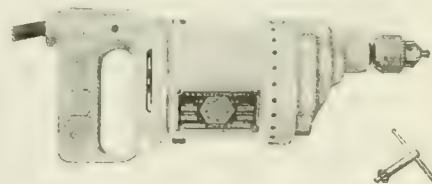
UNIVERSAL ANGLE PLATE

to it and the motion of the working surface is through the axis of the arc of oscillation. Accurate gradations with Vernier attachment reading to 5 minutes permit of its use especially for fine work. The tool is rigid and well built, and has unlimited possibilities of application for work in connection with lathes, planers, milling machines, shapers, drill presses and grinders as well as in connection with die-sinking machines.

A number of different sizes are made and two types, one with handle and worm for actuating the platen and one without.

PORTABLE ELECTRIC DRILL

This drill shown is perhaps the lightest weight drill of this capacity made, weighing only 6½ pounds and having a no-load speed of 1600 R.P.M., full-load energy consumption of 175 watts, at which the speed is 1,000 R.P.M.; it is 4" in diameter and 12" over all. It will take any size drill up to 3-16" in dia-



NEW PORTABLE ELECTRIC DRILL

meter and is equipped with a Series Compensated Motor; can be used from any electric light socket on either alternating or direct current, and is especially designed for drilling small holes in steel, iron or wood. It is made by the Black & Decker Mfg. Co., Baltimore, Md.

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Need Help From Ottawa

STRANGE as it may seem, the average Canadian manufacturer is looking on with more interest and expectation at the trip made by Lloyd Harris and those associated with him than on any activity, or near activity, displayed by the Department of Trade and Commerce at Ottawa.

The Canadian manufacturing interests just now stand in need of some real assistance in determining what markets are good and what markets are good to keep out of.

The war has made great changes in this regard and it is too much to expect that individual firms should be put to the expense of going abroad and finding out just exactly what has taken place.

Markets that were formerly good are no good now. The credit has been impaired and it would be bad business to risk much in trying for the business that is showing in that country.

If manufacturers want to take on poor or risky business they do not have to go very far away from home to get all they want of it.

CANADIAN MACHINERY is not interested in the politics of the country, except as those politics have to deal with the success or failure of the interests of the Canadian manufacturers. It is a fact that the Canadian manufacturer does not receive the assistance from Ottawa that he should, and it is a fact that right now is the time when he wants all the help he can get.

This paper has made some inquiries, and there is undoubtedly a feeling that the Department of Trade and Commerce at Ottawa should be reorganized along lines that will do something more than issue bulletins and deliver addresses.

The problem of the small shop is one that figures in this case very considerably. During the war many of these smaller places carried out very important sub-contracts. They neglected what business they had formerly developed, and now they find themselves with their war business gone and only a vague notion of what to turn to. They have no organized selling force. They know little or nothing of local markets.

They have, though, a plant that is in much better physical condition than before the war. They have a better labor market by reason of the fact that a large number of people in the community have worked for years in munitions plants to very fine dimensions.

CANADIAN MACHINERY believes that it states a real condition when it says that the manufacturing interests of the Dominion are waiting for Ottawa to give them the service, through its Trade and Commerce department, that they are entitled to, and which they must have if they are to develop.

Sales Force is Very Large

DON'T make the mistake of thinking that the man who goes out on the road for your firm is the only salesman around the premises.

If you are connected with the business at all you are part of the selling force, and you can spoil sales as well as make them.

You can write a man's name wrong, you can give him wrong initials, you can get him in such an irritated state of mind that the other company will have a splendid chance to make the sale.

The man operating the turret lathe, the planer or the miller is a bit careless about the measurements. He takes a chance. He is selling goods—but for some other company.

Here's something that a former shipping clerk wrote of his experience in this matter:

As a shipping clerk, the writer once sent some one hundred and fifty upper valves for working barrels to the Carter Oil Company. The shipment went to Lincoln County, West Virginia, which happens to have no roads except cow trails and dried-up creek beds. The shipment of valves was hauled horseback up one of these dry creeks. There had been an error in making up the shipment—the cups on the valves were 1 $\frac{7}{8}$ " instead of 1 $\frac{3}{4}$ ". It took three weeks to get the right valves from our Pennsylvania factory to Lincoln County, and during that time a score of oil wells had to be shut down. The loss ran into thousands of dollars.

I thought I was just a shipping clerk, and had a boyish longing to be a salesman on the road; but all along I was a salesman—for that mistake of mine sold future goods for a competitor.

Making New Year's Resolutions

IT'S a grand old habit that people have of making good resolutions at the first of the year. Nearly every person does a bit of this every year. In fact the person that can pass the first of a brand new year without making a few resolutions must be a hardened old sinner.

It's an easy matter to hop one's self on the mental scales, and then toss on all the good points on one side, and the shady and positively bad stuff on the other. The trouble is that when a person is considering his own good and bad points he's apt to give the advantage to that side of the beam that carries the stuff that he's bold enough to label "not half bad."

Of course people bust the resolutions that they make at New Year's time. But the very fact that they think it is necessary and advisable to make a few new ones is pretty good proof that the chap is not entirely hopeless. He can see where he needs a few alterations in his habits, and where it is desirable that he should have a few patches on his code of habits and manners.

The fact that your resolutions are apt to fall by the way is no good reason why you shouldn't make any more. If none were made none could be busted, and if none were busted there would be no need of making any more. So in the long run you see that the busting of resolutions is really the thing that keeps up the need for making more of them.

It's a good idea around the start of a new year to get up alongside a good sized measuring stick and see how you size up by it. Don't make the mistake of standing alongside a foot rule and imagine that you're pretty big and pretty straight. Much better to stride up to a ten foot pole and find out what a little chap you really are. If you ever get it into your head that you're big and straight and all right generally, the day of your growth and development has passed. On the other hand, if you're honest enough to have a fair stock-taking of your own real self, and own up to the fact that you're a pretty small squirt, then you have a chance to go ahead and amount to something.

But above all else, don't choose a small rule when you go to take your mental and moral dimensions.

Ninety Years of Age and Still at Business

John McClary, Although He Nears the Century Mark, is Still Hale and Hearty—The Remarkable Growth of One of Canada's Big Industries

LONDON, Jan. 8—Although he celebrated his 90th birthday on Thursday, January 2nd, John McClary, the founder of the McClary Manufacturing Company, is still hale and hearty and spends a great deal of his time at work. Born on a farm near London, in 1829, he came to London in 1847, and started in at the trade of tinsmithing. Seized with the gold fever of 1849, at the age of twenty, he left for California. His was not to be the life of the gold miner, for two years later he returned to London, where he has lived since.

In company with his brother Oliver, he opened up a business then which has since spread from coast to coast, the headquarters of which occupies two large blocks in London and employs more than 1,500 men. The first lines of their manufacture were plows and tinware. The house in which they opened up their factory stood on one small portion of the block on which the tinware and enamelware department is now situated. At first they employed half a dozen workmen. John was then what would now be termed manager, and Oliver was sales manager.

Their customers were the hardy pioneers that were settled between Windsor, Woodstock and Brantford, and Stratford and Lake Erie. Their manufactured goods were delivered by salesmen in wagons driven over the trails that served for roads at that time. All of their raw material had to be teamed from Port Stanley or from Hamilton over roads that for many months in the year were practically impossible.

With the opening of the Great Western Railroad in 1853-4, began the expansion of the business which has grown so rapidly and which is still dropping its branches to take root in other places in the Dominion. Shortly after the entrance of the railroad, the firm decided that the rush of settlers to this part of the Province would provide a good market for stoves and accordingly made the change. It dropped the manufacture of plows for the manufacture of stoves. The name of the firm was changed from that of J. and O. McClary to the Ontario Stove Works, but the management continued as before. Later the partners decided to add to their products and started in the manufacture of furnaces and enameled wares and also commenced a jobbing trade in sheet metals.

The business continued to grow and in 1871 it was incorporated in Ontario under the name of The McClary Manufacturing Company. In 1882, a Dominion charter was taken out, thus enabling the firm to do business in any part of Canada.

Toronto was the first place chosen for a branch office. In 1879, one was opened there with David McKillop in

charge. A second branch was soon opened in Montreal under the management of Andrew A. Brown. In 1880, the first Western branch was opened in charge of J. W. Driscoll. Vancouver was entered in 1894, and in 1901 and 1902, branches were opened up in St. John, N.B., and Hamilton respectively.

It was about this time that the second large building was erected in London. The foundry was moved to the new building, which now occupies nearly as much ground as the old plant where the tinware and enameled ware shops are located together with store-houses.

In 1909, the Calgary branch and a sub-branch at Saskatoon were opened and in 1910, the ninth branch was opened and Edmonton was the spot chosen.

Since the advent of Hydro-Electric power in London and the use of it having become more general for cooking, the company has started in the manufacture of electric heaters and ranges of all styles. During the early years of the war many field kitchens were manufactured for the Canadian army.

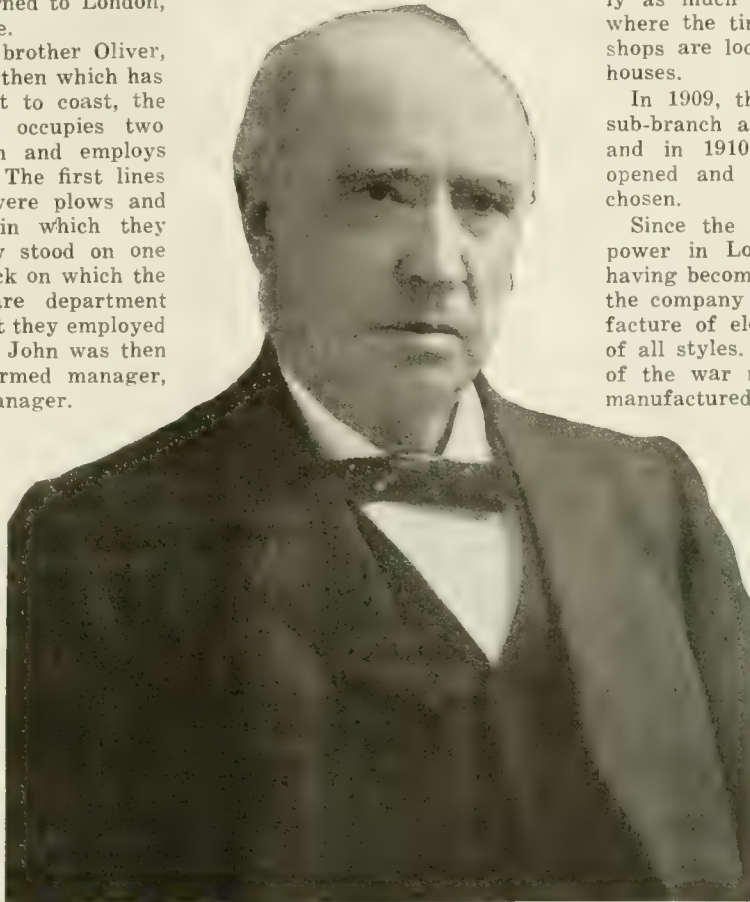
Business, the favorable trade conditions of the country in general and of his own organization in particular, is Mr. McClary's constant consideration. In this connection there is no problem too large for him to tackle, nor any detail too small to interest him. To him the news of the day, whether it be the proposal of some new foreign ship canal, political unrest in some distant kingdom, or the price of garden stuff at home, are not simply unrelated facts to be allowed to pass

unheeded, but the cause for some corresponding effect upon transportation, immigration or living conditions within our home country, which will have its effects on the trade and welfare of the country. It is this habit of figuring out results that has established his reputation for an almost uncanny foresight, which is all the more remarkable in that it does not allow itself to be warped or obscured by the common defect of a personal bias. It is due to his industry and foresight that the McClary Manufacturing Company has reached its present position and it is still going strong.

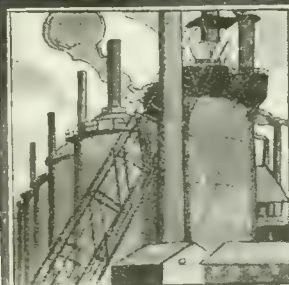
Canada has 138 daily, and 921 weekly newspapers.

It takes the product of 20,000 acres of pulp-wood forests every year to supply Canadian newspapers with white paper.

The principal pulp and paper mills of Canada are located in the provinces of Quebec, Ontario, New Brunswick, Nova Scotia and British Columbia.



JOHN MCCLARY



MARKET DEVELOPMENTS



Buyers and Sellers Getting Closer Together

Every Price Concession Made Now Has a Tendency to Reduce the List of Those Waiting For Lower Levels Before Making a Purchase—Deep Cuts Made in Scrap Prices

ONE class is coming quite noticeably to the front in all departments of trade in machinery, steel, iron or metals, and that class may be lumped and called "waiters," and the principal reason assigned for their attitude is one of expectation in regard to declining prices. There is at present a fairly wide margin between what purchasers think they should pay and what sellers think they should get, and any concessions that are made tend to bring the sellers and buyers nearer to that point where they can be, and do business, to mutual advantage,

It is not expected there can be, for instance, any big reduction announced by the steel mills in Canada to meet every cut that is made by the big producers on the other side of the line. Warehouses, in many cases, are full of material that has cost more than the present U.S. price, and if the Canadian price were put down to a competitive basis at once it would mean a serious situation for these interests. As it is they show a marked tendency to sell at very close prices just now. They want all the business they can secure, and one way to secure

it in the face of competition is to introduce a certain amount of flexibility in their selling prices.

There are some enquiries for equipment for railroad shops and other lines but otherwise the machine tool trade is quiet. Dealers are not showing any particular desire to stock up on shell shop equipment, although there is a big opening to do so now. Some sales have been made, but mostly from places where operations had not been going on long before the word came to cancel.

A new list is out this week for scrap metal prices, and the cuts that have been made bring prices down to a poor looking remnant of their former war-time greatness. A few sales are put through at better prices, but in such cases there is always more or less urgency in the sale. For instance, one shell shop sold a car of copper turnings for 17c pound only a few days ago. To-day they could hardly expect to get over 15c. The 17c was paid because the dealer making the purchase had a contract that he had to fill or face cancellation. His need made 17c the price, but the price lasted for that one car only.

SLIGHT REVIVAL NOTICED IN MACHINE TOOLS IN MONTREAL

MONTREAL, January 9.—Present hopes are built on the ultimate plans of any reconstruction policies that may be adopted by the Government or the manufacturers, but as yet these plans have not been advanced far beyond the suggestion stage. In some cases the large industrial establishments that have been interested in munitions are retaining their organization intact so as to be in a position to immediately undertake any enterprise that may develop from the activities of the Trade Commission. While some of the smaller mushroom plants have ceased to exist, the majority are resting on their oars in the anticipation that the early future will bring a proportionate return of war activity. Railroad shops and shipbuilding plants are quite active, but few are marked with the night operations of a few months ago.

Waiting Attitude in Steel

The usual quiet spell that follows the New Year holidays is additionally em-

phasized this year owing to the recent cessation of war activities and the uncertainty that invariably accompanies such conditions. The country has not yet settled down seriously to a definite policy of reconstruction, and as a consequence the readjustment to a more normal basis of ruling quotations is correspondingly delayed. Marine development is the principal factor in present business, and together with the railroad activity is responsible for the bulk of current steel demand. Dealers here report a comparatively quiet situation, due partly to seasonable conditions and to the waiting attitude generally assumed by consumers, anticipating as they do a still further decline in price quotations. Since the market has been freed from control the domestic buying has shown a slight increase, but little is being purchased for future activity. In the opinion of some dealers here this condition will likely obtain for several weeks yet, but a gradual resumption of

normal activity is looked for in the course of a couple of months.

Metals are Quiet

To all intents and purposes the metal markets are open for all business, as practically all control has been removed; despite this condition, however, the situation is not marked by any sharp declines of any importance. Copper is receiving the attention of dealers and producers, and the formation of the American Copper Export Association marks one of the reconstruction moves of this body. The situation here is quiet but domestic business is of fair volume. The situation in tin is one in which the trading is more or less uncertain. It appears that much more tin has come to light than was thought possible, and now that the market is on the downward glide the metal is being produced. This may be responsible for the attitude of the British authorities in holding up shipping permits from England. As a consequence of the holidays and the general inactivity of the industrial situation all metals are exceedingly quiet. The local market is featureless with quotations going to lower levels. Copper shows a decline of

2 cents on lake and electrolytic, the price asked being 27 cents per pound. Castings is now quoted at 26 cents per pound. Tin is quoted at 75 cents, a drop on the week of 5 cents per pound. Spelter is unchanged at 9½ cents. Lead at 9 cents is ½ cent lower than last week. Antimony is weaker, having declined from 11 cents to 10 cents per pound. Aluminum is in light demand with 43 cents as the nominal quotation.

Railroad Demand Increases

Some revival in the machine tool inquiry has been noted of late in respect to the railroad requirements. This is not very pronounced but sufficient to maintain the interest among the dealers and the manufacturers. In general, however, the demand is light respecting new equipment, but considerable trading has taken place in connection with used tools. It may be of interest to note that single tools such as lathes, planers, and drill presses, are being bought by those who have acquired a little experience in connection with their work on munitions and will be utilized by these men in setting up small repair shops in some of the smaller towns throughout the province. The supply business is not exceedingly active but volume is by no means discouraging.

Scrap at a Standstill

With the industrial world relatively teeming with all classes of material that is generally recognized by many as fit for nothing but scrap, it is a remarkable fact that the market in old materials is practically devoid of any pronounced activity. It is true that light trading continues to be a factor of present business, but this is invariably for current operations as no actual interest is displayed where future activity is, or might be, concerned. It is, however, assumed by different dealers that considerable buying will develop as soon as more stabilized conditions are effected. As a matter of fact some dealers here announce good inquiries from large consumers for early deliveries. Scrap prices quoted are of little assistance at the present moment as dealers state they have virtually nothing on which to base their buying or selling prices and each transaction must be carried out on its own individual merits. Current prices are therefore only nominal, but readjustments may be anticipated in the near future.

FORD RAISES MINIMUM

A new minimum wage scale of \$6 a day, a flat increase of \$1 a day for approximately 28,000 employees throughout the country, was announced recently by the Ford Motor Company. Employees of the Ford tractor interests also are included in the increase.

Twenty-three thousand other employees of the Ford interests already receive \$6 or more a day.

Coincident with the announcement of the wage increase, it was made known that Henry Ford has formally resigned as President of the Ford Motor Company, and his son, Edsel, elected to suc-

POINTS IN WEEK'S MARKETING NOTES

Montreal reports indicate that there is a slight revival in the demand for machine tools, particularly from the railroad shops.

It is understood that Canadian steel mills are about to figure on rather large tonnages for the Government railroads. Such orders would be acceptable to the mills just now, as there is not a great volume of new business offering yet.

A new list of prices for scrap material was handed out this week. There is an all-round reduction that amounts to an average of about thirty per cent.

One munition firm secured 17c per pound for a car of copper turnings, but on a sale that was urgent. The dealers would not pay over 15c for the same material to-day.

Pittsburgh reports indicate that a decline in steel production is looked for there, experts figuring out that it may run as high as 40 per cent. of the high mark recently attained. It is hardly likely that steel prices in Canada will be at once reduced to meet the cuts announced in United States. Many of the warehouses in Canada have stocks on hand that cost them much more than present base prices. Holders of this stock are running it off at prices very close to their actual cost figures.

ceed him at a salary of \$150,000 a year.

Mr. Ford, in tendering his resignation, gave as his reason his intention to devote more time to the tractor industry. He retains his seat on the Board of Directors of the company in an advisory capacity.

SCRAP PRICES ARE PUT ON LOW LEVEL

Reasons Why Prices of Steel Are Not Lowered In The Canadian Trade At Present

TORONTO.—There seems to be a feeling of lack of confidence in the market situation. It makes little difference in which direction enquiry is made, the same thing will be found true. Hayden, Stone & Co., of Boston, mention something this week that applies to the situation regarding machine tools, supplies, steel, iron, scrap, or almost any commodity that comes within the circle of operations covered by this group. The statement referred to is as follows:

"Until the producers and consumers of the great staple articles, particularly iron and steel, get together on a basis

where they can do business freely, the business world will have such an air of uncertainty that its effect cannot but be communicated to the stock market. Reaching a basis on which business can be freely carried on cannot be effected in a moment after such a prolonged period of artificial price stimulation as we have been passing through, but we believe—before this month is ended—we shall see good progress. The first step taken was in the price reduction announced. This was a wise movement as tending to bring producers and consumers together. . . . As a matter of fact the cycle of advancing wages has reached such an acute stage that there is really no benefit to be gained by any further advance in wages. While we all like to get as much as possible in dollars and cents, there is no gain whatever when any advance in the money wage paid is immediately followed up by a corresponding advance in everything that goes to make up the cost of living. The process has reached this point. After all it is not so much a question of how many dollars a man receives as it is how much these dollars will buy, and we may be very sure that it is not until the number of dollars received by the average laborer is decreased, that the purchasing power of the individual dollar is increased."

The result of the facts—for they are facts—contained in the above is found in the machine tool, steel, scrap, or any other line of business. The general attitude of the purchasing public is "waiting." When that attitude becomes chronic it creates a serious situation.

The Steel Trade

Warehouses report that the month of December was a good one. In some lines a very active business was done. For instance, in the matter of tubes one house informs CANADIAN MACHINERY that in December they did three times as much business as they have done in any month for a long time. The question of Canadian mills coming out openly and meeting the prices of Pittsburgh is talked of, but there are many points involved before such a move could be considered. It would tend to demoralize the whole trade in some ways. For instance, there is hardly a warehouse that has not in its stocks of steel bars that have been placed there at a cost of 4c or better. Were the Canadian mills to cut deep down in the price it would mean that these warehouses would have to sell out for what they could get, and the loss, where fairly large stocks are carried, would be serious. Although no actual cuts have been made in the last few weeks in the price of steel shapes and tubes, there is considerable flexibility in some of the price lists that is helping to meet the situation, and bringing buyers into the market whereas they would otherwise join the list of waiters.

Machine Tool Trade Slow

Machine tool dealers report business as very quiet in the metal working industries, but several inquiries are in for

machinery for wood working and other lines. Plants that have been making shells are not only busy getting rid of their stocks, but are doing their best to get their adjustments made as quickly as possible. Machinery that is not good for any other operations is being sacrificed in many cases, as those having it for sale probably reckon that it does not owe them anything. Some dealers have taken in a quantity of shell shop equipment, while other houses refuse to touch it at all. There do not appear to be any hard and fast lines along which the various firms are working. Some of the tools taken in are general purpose, and have been used very little. They have been bought "at a price," and the dealers in question are content to put them away and forget about it for a while.

A Scattered Market

It has frequently been explained in these columns that the quotations for second hand materials appearing on another page in this paper do not at present represent an actual basis of operation, for the simple reason that dealers are not in the market to buy unless they have contracts that have to be filled or cancelled. One case of this came to light a few days ago when a car of copper turnings from a munitions shop was sold for 17c. The reason for the price was that a dealer had a contract to fill by a certain date, and had he not secured the material at once his contract for the entire amount might have been cancelled.

The trouble with the explanation in these columns of the prices on another page is that readers sometimes look only at the quoted figures, and are thereby led astray. With this in mind, CANADIAN MACHINERY to-day asked one of the leading dealers in Toronto for quotations at which he would buy, and these are made the basis for the quotations given in that column to-day. The reductions are more than liberal. Those having much to sell will be inclined to hold on for a while in the hope that there may be a revival in the market that will help matters. All coppers are down to 15c; heavy melting steel from \$22 down to \$15; boiler plate from \$20 to \$15, car wheels from \$30 to \$18, and so on. "Those prices are the ones at which we will buy," remarked the dealer, "and you will see that they represent a very substantial reduction from the figures that have formed the basis of dealing for some time back." Aluminum is given in his list at \$18 per hundred, but we know of one dealer in Toronto who has a quantity on hand for which he cannot secure 14c. The scrap market is in poor shape and it does not show signs of improving very rapidly.

Moving to Toronto.—The Elgin Mfg. Co., which was organized last June in St. Thomas for the manufacture of 18-pounder British shrapnel, has been sold to the manager, J. D. Cumming, who proposes dismantling the plant and disposing of the machinery. Later, Mr. Cumming proposes to start the manufacture of coal pulverizing machinery in Toronto.

STEEL PRODUCTION IS LIKELY TO SHOW A FALLING OFF VERY SOON

Special to CANADIAN MACHINERY

PITTSBURGH, Pa., January 9.—The whole pig iron market has now come down the \$3 a ton originally suggested in the price reduction programme the American Iron and Steel Institute committee had prepared for submission to the War Industries Board at the meeting of December 11, but which the Board refused to hear read, as it had decided to discontinue price fixing after December 31. The steel producers adopted the suggested reductions in steel prices very promptly, but the merchant blast furnaces held off. There have been very few sales simply because there has been very little demand, but enough sales have occurred to show that any furnace expecting to sell must accept at least \$3 a ton less than the Government prices formerly ruling.

The reduced prices are as follows: Bessemer, \$32.20; basic, \$30; No. 2 foundry (1.75 to 2.25 per cent silicon), \$31; malleable, \$31.50; forge, \$30. Under Government control all prices were f.o.b. furnace except that during the fourth quarter of 1918 Tennessee and Virginia furnaces were allowed to charge delivered prices equal to base price plus freight from Birmingham to point of delivery, while eastern Pennsylvania furnaces were allowed, similarly, to use Pittsburgh as a basis. This gave the furnaces involved somewhat higher than base prices f.o.b. their furnaces. Now, however, various questions will arise. In open market conditions pig iron prices are not uniform at furnace as some districts develop lower or higher prices than others. Eastern Pennsylvania furnaces cannot stay on a Pittsburgh basis as that would make prices too high, while again, their prices normally rule somewhat higher at furnace than is valley iron at furnace. Southern iron, of course, must be at less than northern at furnace or it will not sell in sufficient volume since to engage the capacity of southern furnaces much iron must be sold in the north with heavier freights than must be paid on northern iron to delivered points. Birmingham prices used to rule about \$3.25 below valley prices. Now Birmingham and valley are both quoting \$31 at furnace on foundry iron, and Birmingham iron must come down still more, while besides that, the Birmingham furnaces are not nearly as well sold up as the northern furnaces. Eventually all these things will have to be straightened out, and this will make it difficult to maintain pig iron prices. Competition will more readily develop in pig iron than in steel since steel prices are easier to maintain because practically all steel prices are based on Pittsburgh, plus freight.

As to adjusting prices under pig iron contracts, each case will probably be considered individually. Nearly all buyers of pig iron who have contracts at Government prices are requesting that the \$3 concession be made, and while

furnaces have said a good bit about contracts being contracts and enforceable at law, the probability is that in most cases the furnaces will eventually recede and make the concession. They suggest that an important consideration will be whether the customer would be put at a disadvantage by reason of competition in his finished products if required to pay the contract price.

Steel Demand Light

Demand for steel products generally is very light. As to new buying and enquiry there is practically none, while specifications on contracts are light. There is, of course a large tonnage of contract tonnage on books, but it does not mean actual business unless the buyers specify or give actual shipping orders. The mills are of course ready, as a rule, to accept orders under the contracts at the recently reduced prices instead of at full contract prices, but that does not bring much business. For a time the mills made claims that they would hold buyers to contract prices despite the open market reductions, but no one took that talk very seriously. What was expected, perhaps, was that shipments through December would be invoiced at the old prices, but in some cases at least the concession was made to apply even to shipments between December 12, the date when some steel mills announced the reduced prices, and December 31.

The New Steel Contract

There is much more discussion than adoption of the new form of contract for the sale of finished steel products approved by the board of directors of the American Iron and Steel Institute and recommended for adoption by the trade. The feature of the new form is the provision for "liquidated damages," to be paid by the mill if it fails to ship on time and by the buyer if he fails to specify on time, the "liquidated damages" to be the difference between contract price and market price at time of failure, but in no case to be less than five per cent. of the contract price. The statement has been printed in two trade papers that the new contract is "already in use by leading steel producers," but that is not correct unless the phrase "in use" be interpreted quite liberally. It is certain that regular contracting is not being done with the new form, and it is very doubtful whether a single steel producing company has yet had contracts printed with its name thereon. The form that is used for discussion is a form printed by the institute, with no particular steel company name printed.

Generally speaking the steel producers favor adoption of the new contract form, but they are looking for leadership. Usually leadership is furnished by the United States Steel Corporation, but it seems there still needs

to be discussion between the corporation officials in New York and the heads of the subsidiary companies, which make the actual sales, before a unanimous opinion is developed.

If this new contract form were adopted the result of course would be to limit very greatly the amount of forward buying and forward selling, as neither party would be willing to commit himself so far ahead when the contract had to be lived up to. Hitherto at one time buyers would fail to specify, while at another time mills would fall behind in deliveries. Buyers overbought and mills oversold.

Trade Prospects

The entire trade, buyers and sellers alike, are in accord that it is unlikely

there will be much market activity for some time to come, say for three months at least. While it is sometimes contended that prices will not decline further, there is practically no doubt that in time they will. Doubtless, as has been the case in the past when buying practically ceased at a time when there was much contract business on books, prices will be maintained as far as possible to encourage buyers to take out contract material. When there is not much more business in actual shipping orders to be squeezed out of contracts, and when there is a disposition on the part of consumers to make fresh sales, prices will come down to whatever point is necessary to get buyers to take hold. The steel mills always endeavor to avoid reducing prices

to the last point until the buyer is known really to be ready to take hold.

There is practically no doubt that steel mill operations will drop to less than 75 per cent. of capacity within a very few weeks, and a rate of 60 per cent. or less may be reached. Capacity may now be estimated at about 49,000,000 gross tons of steel ingots a year, while in 1913, the best year before the war, production was about 30,300,000 tons, and capacity at the end of the year, or just before the war was about 34,000,000 tons. Thus even a 60 per cent. operation of the steel mills at this time, when there is scarcely any new construction work going on, and hardly any railroad buying, would really represent quite a lot of steel in the circumstances.

THE WEEK IN INDUSTRIAL HAMILTON

THE RETURNED MEN GET THE PREFERENCE

**Canadian Westinghouse Expect to Have
Larger Force at Work Soon**

HAMILTON, Ont.—The Canadian Westinghouse, which was a big manufacturer of munitions for the Allied Governments, is returning with renewed energy to the manufacture of its numerous products, and is confident of greatly increased business during the present and the next few years. During the war the plant employed about 2,600 hands, working on munitions.

With the cancellation of war orders the company found it necessary to dismiss only a very few of their men during the period which it will require them to return to staple lines again. Just now the company is arranging for new orders, and they expect to increase their staff over their war strength. More than 700 men voluntarily enlisted from their plant, and positions will be given each of them on their return. Already over 200 returned men are employed there, and preference is being given the veteran and Britisher.

TRADE WITH SIBERIA IS BEING CONSIDERED

**Hamilton Men Are Organizing To See
What Can Be Done in the
Matter**

HAMILTON.—M. J. Finlay, representative of the Canadian Trade and Commerce Department, is touring Canada under the direction of Sir George Foster, in an effort to try and secure interest among manufacturers in the shipping of their products to Siberia. Mr. Finlay, who is a young man, has lived in Siberia for a number of years, having been connected with various agencies, including that of the Lloyd Company. He also became a Red Cross

worker when conditions required that the Russians needed assistance.

In Hamilton he spoke before a large gathering of local manufacturers, including representatives of almost every industry in the city. He went over the advantages and the difficulties of handling goods in Siberia in a very efficient manner, explaining that at the present time Siberia boasted one railway which ran several hundreds of miles. He also referred to the rivers of the country which have been put to use for transportation purposes, and stated that the railways were equipped to handle heavy weights up to about two tons, but that other than those weights should be packed in boxes of about three by two by one feet.

A scheme was suggested by George Martin, general traffic manager of the Toronto, Hamilton and Buffalo Railway Company, whereby the Dominion as a whole, in going after the new trade in Siberia, should co-operate; the banks to establish branches in Siberia, and the various manufacturing interests, with the assistance of the Government, to build a huge warehouse at the port of entry, and for all companies to ship their products to that house, where an efficient sales expert representing every line shipped, would handle the sales.

Manley Morden, manager of the head office of the Bank of Hamilton, drew attention to the fact that a local banker had been appointed to the commission which was to investigate conditions in Siberia, and that he could not comment on the subject until such time as the report of the commission was available. However, he expressed his belief that the Government, in appointing a banker to the commission, had the same idea in view as proposed by Mr. Martin, so far as the financial end of it was concerned.

The board of trade are going to meet again and consider the matter, and advise the Trade and Commercial Department that, if they can arrange guaran-

tees of payment for the goods, that local concerns will ship goods to the country.

M. J. Finlay stated it was only a matter of a very short time before the representatives of the Allied Governments would, at the peace conference, decide upon some definite policy for the country, and that the period of revolution would be passed.

"The trouble there now is that they have never before had freedom of speech, and now that they can talk they all want to do it at once and the country is not big enough to hold them, although it is very large," said Mr. Finlay during his address.

HARD TO SECURE SUFFICIENT GAS And in Consequence a Number of De- partments are Being Closed Off

Hamilton.—That a number of local manufacturing concerns will be forced to close certain portions of their business because of the putting into effect of the order shutting off the use of natural gas at the end of the present month, was the statement made by P. V. Byrnes, manager of the United Gas and Fuel Company to CANADIAN MACHINERY.

Under the original order of the Government Gas Commission, issued last July, all natural gas to manufacturing concerns in the city was cut off. Many of the manufacturers got busy and were granted special permits to use the gas to the end of the present month. In some cases this will mean the partial closing of certain manufacturing concerns, and in a few cases, unless a further extension to use gas can be secured, it will mean complete closing. The Westinghouse is one of the concerns cut off entirely, and it will mean the closing of some departments. The International Harvester have been cut off but have secured a permit for the use of gas for their restaurant, which is maintained for the exclusive use of employees.

Many Shops Have No After-War Problems

Feel That More Assistance Should be Given by the Trade and Commerce Department—Australian Trade Has Been Difficult to Hold During the Years of the War

Special to CANADIAN MACHINERY

BRANTFORD, January 8.—Several of the manufacturers in this city have no after-war problems to deal with. In fact they are in a much better shape than those in several nearby places that have been working exclusively on war contracts. There have been big war orders placed and completed here in the last few years, but many of them have been finished and regular lines substituted well in advance of the signing of the armistice.

As a matter of fact, Brantford is also about the only place in the country that still has war contracts that may live. Dominion Steel Products, Ltd., who intend to go into the building of engines and marine work, have orders that stand for gun mounts, while Motor Trucks, Limited, have a contract for 9.5 shells that hovers between life and death. Officials of this latter company, when asked by CANADIAN MACHINERY in regard to the present standing of the contract, said that they were not in a position to state definitely just how their contract stood. Neither were officials of Motor Trucks ready to state what they were going to do with their immense plant once the war orders are out of the way. It is generally understood that they have a pretty good idea of the lines they will follow, but Mr. Detwiler, president of the company, stated that for the present they preferred not to discuss their plans for publication.

Canadian Manufacturers' Position

"The Canadian manufacturers right now are not facing any worse position than they were at the outbreak of the war. Then they did not know that the war was coming. We passed from a peace footing to war conditions over night. Recently it has been known for some time that the war was going to end, and end right, and the manufacturing interests are in better condition to pass back to peace lines than they were to undertake the new and untried lines of war material." Such is the belief of Logan Waterous, of the Waterous Engine Co. At present orders for the U.S. Government for 12 large marine boilers are in course of completion in the well-known Waterous shops, and there has been no slackening of effort in other lines of work. "Provided there is a good season in the lumber business we should also feel the effect of this," continued Mr. Waterous. "We had British contracts in our shops for the 4.5 shell, but these were finished some time ago, and our policy since then has been to develop our old lines. In fact we never dropped them." Mr. Waterous, in discussing the possibility for Canadian manufacturers

entering the foreign market, stated that there was no doubt a great need for a more aggressive policy on the part of the Department of Trade and Commerce at Ottawa. Manufacturers needed assistance at present in entering markets that had been unsettled following the war. It was not fair to ask individual manufacturers to go ahead and do this work entirely on their own initiative. Mr. Waterous was satisfied that this same feeling was quite common among the manufacturers of Canada who were producing lines suitable for export business.

The Cockshutt Plow Co.

This is one concern that is looking after trade abroad as well as at home; in fact the bulk of the output goes to foreign markets. The Cockshutt Company are preparing now to send abroad for business. Col. Harry Cockshutt, chief of the experimental department, and G. K. Wedlake, are leaving in a few days for Europe, and expect to spend some time on the continent, while James A. Latimer, who has spent some years in Australia in the interests of the Cockshutt Company, started the first of the week for that country.

"Prospects for business are very satisfactory," stated Mr. George Scott, of the Cockshutt Co., when discussing the matter with CANADIAN MACHINERY. "There are sales being made now that were not possible before. For instance, during the last year we shipped 6,200 tractor plows to England to help in the campaign for the increased production of food there. We have inquiries in for large orders of 12 in., 14 in. and 16 in. plows from West Siberia. The trouble with business there now is who is going to pay the bill. The trade with South Africa has remained remarkably stable during the entire period of the war. In fact it has been a much better place for business than Australia."

Mr. Latimer, the Australian representative of the Cockshutt Plow Co., stated that several things had militated against the development of business with Australia, especially in the last few years. "The most notable of all," he remarked, "has been the increase in freight and shipping charges and the impossibility of securing transportation at any price. Charges that before the war were \$3 for shipping have been as high as \$65. Then again, owing to the shortage of shipping bottoms, the wheat has not been moved out of the country. The Government took over the entire stores of wheat there, and paid the growers three shillings a bushel, with the understanding that when sales were made there would be a dividend on this. The dividend

amounted to about three pence a bushel, which brought the price up to 85c per bushel, which is quite a difference to the price the Canadian farmer has been getting, which is practically three times as much. There is a tremendous store of wheat in that country now, parts of the crops of 1915-16-17 and 18 being still stored there. This has had the effect," stated Mr. Latimer, "of making a good many of the growers leave the land. In fact it is estimated that 40 per cent. of the growers quit the business. Such a state brought a lot of used farm machinery on the market and hurt trade considerably. There are easily 165,000,000 bushels of grain in Australia now.

"It is almost impossible for Canadians to get in there to sell buggies and wagons, as there is a high tariff of 55 per cent. maintained against foreign importations in these lines. In fact that is true of many of the lines that it has been found possible to make in Australia. There is a 20 per cent. tariff against plows. On binders there had been none until the war, and now there is 5 per cent. for revenue." Mr. Latimer will make an extended tour of the country and will be away for some time.


Mr. Scott, when on the question of export business, stated that the manufacturers could be greatly assisted by a more vigorous campaign on the part of the officials of the Trade and Commerce Department. "There are many doubtful markets, and the individual manufacturer should not be expected to go ahead and find out all the facts himself. If it's bad or doubtful business he's after, he doesn't have to send so far away from home for it."

The labor situation has been such as to hinder production at the Cockshutt plant for some time, although there has been an improvement lately. Several of those who have been working in munitions plants for some time at high wages do not care to go back to work at anything approaching the old scale. They have saved some money and aren't particularly anxious to come down to the smaller wage connected with the peace line.

The Question of Material

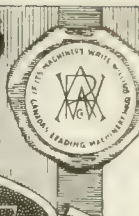
Goold, Shapley & Muir turned out a large quantity of munitions. They were early in this business, and secured good results from their 4.5 contracts. Speaking to CANADIAN MACHINERY, W. H. Whitaker, secretary-treasurer of the company, stated that the manufacture of tractors here was a difficult matter because of the competition of the American firms, who were able to buy the raw material to better advantage than the

Continued on page 69



THE A.R. WILLIAMS MACHINERY CO. LTD.

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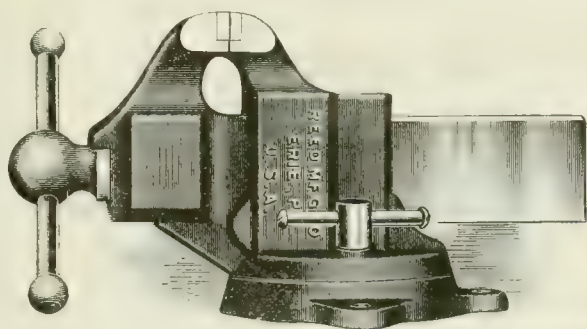
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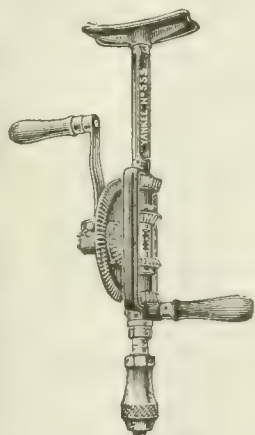
MAKING THE GARAGE PAY

Nineteen-Nineteen will undoubtedly be a banner year for garages. This is, to the garage equipped to MAKE IT PAY. Therefore, why drift along without the many inexpensive lines that reduce your overhead by facilitating rapidity of work. With prices right, and an excellent stock, the following lines meet your expectations.



Reed Vises

Have established a reputation of high quality. Backed by a guarantee to be right in every respect. A guarantee that says if there is anything anywhere wrong with a REED Tool it will be repaired or replaced free of charge.



YANKEE DRILLS

Yankee Tools

In these days, when, to come out on top, the newest, cleverest and quickest operating tools are in demand, no tools meet the situation like YANKEE. An efficient, strong, durable and smooth working tool, covered by inductive prices, make it the tool for garage use.

Wright High Speed Hoists

These four words have spelled success to the manufacturer of a particular line. For fourteen years they have been advancing to meet every condition. The service a WRIGHT Hoist gives you indicates its quality, for the material in every part of this hoist is the best that can be obtained. For overhead space and where short distance between hook is essential, WRIGHT Hoists will meet your requirements. When you buy a WRIGHT Hoist you get maximum efficiency at minimum cost. Make your next hoist a WRIGHT Hoist.



Mossberg Socket Wrenches



These Ratchet Sets are leaders in their line, a line that will reduce your overhead by facilitating rapidity of work. For present day methods they are a necessity. Pressed out as they are from high quality steel, they assure you of long life and big returns for small outlay.

The A. R. WILLIAMS MACHINERY CO., Ltd.
TORONTO, ONTARIO

SELECTED MARKET QUOTATIONS

Being a record of prices current on raw and finished material entering into the manufacture of mechanical and general engineering products.

PIG IRON

Grey forge, Pittsburgh	\$32 75
Lake Superior, charcoal, Chicago.	37 50
Standard low phos., Philadelphia.	37 25
Bessemer, Pittsburgh	33 40
Basic, Valley furnace	

Government prices.

	Montreal	Toronto
Hamilton		
Victoria		50 00

IRON AND STEEL

Per lb. to Large Buyers.	Cents
Steel bars, base, Toronto	4 90
Steel bars, base, Toronto	5 00
Steel bars, 2 in. to 4 in. base	6 00
Steel bars, 4 in. and larger base ..	7 00
Iron bars, base, Montreal	4 55
Steel bars, base, Montreal	5 05
Reinforcing bars, base	4 50
Steel hoops	7 50
Norway iron	11 00
Tire steel	5 50
Spring steel	8 00
Brand steel, No. 10 gauge, base ..	5 05
Chequered floor plate, 3-16 in.	12 20
Chequered floor plate, ¼ in.	12 00
Staybolt iron	11 00
Bessemer rails, heavy, at mill	
Steel bars, Pittsburgh	*2 90
Tank plates, Pittsburgh	*3 25
Structural shapes, Pittsburgh	*3 00
Steel hoops, Pittsburgh	*3 50
F.O.B., Toronto Warehouse	
Steel bars	5 50
Small shapes	5 75
F.O.B. Chicago Warehouse	
Steel bars	4 10
Structural shapes	4 20
Plates	4 45

*Government prices.

FREIGHT RATES

Pittsburgh to Following	Points	Per 100 lbs.
	C.L.	L.C.L.
Montreal	29	39½
St. John, N.B.	47½	63
Halifax	49	64½
Toronto	23½	27½
Guelph	23½	27½
London	23½	27½
Windsor	23½	27½
Winnipeg	81	106½

METALS

Lake copper	\$ 27 00	\$ 28 00
Electro copper	27 00	28 00
Castings, copper	26 00	26 00
Tin	75 00	78 00
Spelter	9 50	10 00
Lead	9 00	10 00
Antimony	10 00	11 50
Aluminum	43 00	50 00

Prices per 100 lbs.

PLATES

	Montreal	Toronto
Plates, ¼ up	\$ 8 00	\$ 7 00
Plates, 3-16 in.	8 50	8 40

WROUGHT PIPE

Price List No. 37

Standard Butt weld

	Black	Galvanized
	Per 100 feet	
¾ in.	\$ 6 00	\$ 8 00
¾ in.	5 22	7 35
¾ in.	5 22	7 35
¾ in.	6 63	8 20
¾ in.	8 40	10 52
1 in.	12 41	15 56
1¼ in.	16 79	21 05
1½ in.	20 08	25 16

2 in.	27 01	33 86
2½ in.	43 29	54 11
3 in.	56 61	70 76
3½ in.	71 76	88 78
4 in.	85 02	105 19

Standard Lap weld

2 in.	31 82	38 30
2½ in.	47 97	58 21
3 in.	52 73	76 12
3½ in.	78 20	96 14
4 in.	92 65	114 00
4½ in.	1 12	1 37
5 in.	1 30	1 59
6 in.	1 69	2 06
7 in.	2 19	2 68
8L in.	2 30	2 81
8 in.	2 65	3 24
9 in.	3 17	3 88
10L in.	2 94	3 60
10 in.	3 79	4 64

Terms 2% 30 days, approved credit.

Freight equalized on Chatham, Guelph, Hamilton, London, Montreal, Toronto, Welland.

Prices—Ontario, Quebec and Maritime Provinces.

WROUGHT NIPPLES

4" and under, 45%.
4½" and larger, 40%.
4" and under, running thread, 25%.
Standard couplings, 4" and under, 35%.
4½" and larger, 15%.

OLD MATERIAL

Dealers' Buying Prices.

	Montreal	Toronto
Copper, light	\$15 00	\$13 00
Copper, crucible	18 00	15 00
Copper, heavy	18 50	15 00
Copper, wire	18 50	15 00
No. 1 machine composition	19 00	14 00
New brass cuttings	10 00	10 00
Red brass turnings	13 00	10 00
Yellow brass turnings ..	9 00	8 00
Light brass	7 00	7 50
Medium brass	9 00	9 00
Heavy melting steel ...	20 00	15 00
Shell turnings	9 00	8 00
Boiler plate	21 00	15 00
Axles(wrought iron ...	30 00	15 00
Rails	26 00	15 00
No. 1 machine cast iron	30 00	18 00
Malleable scrap	25 00	15 00
Pipe wrought	18 00	8 00
Car wheels	38 00	18 00
Steel axles	34 00	20 00
Mach. shop turnings ...	9 00	6 00
Stove Plate	22 00	14 00
Cast boring	11 00	8 00
Scrap zinc	6 50	5 00
Heavy lead	6 00	8 00
Tea lead	5 50	3 50
Aluminum	16 00	18 00

BOLTS, NUTS AND SCREWS

	Per Cent.
Carriage bolts, ¾" and less	10
Carriage bolts, 7-16 and up	net
Coach and lag screws ..	25
Stove bolts	55
Plate washers	List plus 20
Elevator bolts	5
Machine bolts, 7-16 and over	net
Machine bolts, ¾ and less	10
Blank bolts	net
Bolt ends	net
Machine screws, fl. and rd. hd., steel	27½

Machine screws, o. and fl. hd., steel	10
Machine screws, fl. and rd. hd., brass	add 20
Machine screws, o. and fl. hd., brass	add 25
Nuts, square blank	add \$1 50
Nuts, square, tapped	add 1 75
Nuts, hex., blank	add 1 75
Nuts, hex., tapped	add 2 00
Copper rivets and burrs, list plus	30
Burrs only, list plus	50
Iron rivets and burrs	25
Boiler rivets, base ¾" and larger	\$8 50
Structural rivets, as above	8 40
Wood screws, flat, bright	72½
Wood screws, O. & R., bright	67½
Wood screws, flat, brass	37½
Wood screws, O. & R., brass	32½
Wood screws, flat, bronze	27½
Wood screws, O. & R., bronze	25

MILLED PRODUCTS

	Per Cent.
Set screws	25
Sq. & Hex. Head Cap Screws	20
Rd. & Fil. Head Cap Screws	net
Flat But. Hd. Cap Screws	plus net
Fin. & Semi-fin. nuts up to 1 in.	25
Fin. & Semi-fin. nuts, over 1 in., up to 1½ in.	20
Fin. and Semi-fin. nuts over 1½ in., up to 2 in.	plus 10
Studs	net
Taper pins	40
Coupling bolts, plus	10
Planer head bolts, without fillet, list plus	10
Planer head bolts, with fillet, list plus 10 and	10
Planer head bolt nuts, same as finished nuts	net
Planer bolt washers	net
Hollow set screws	list plus 20
Collar screws	list plus 30, 10
Thumb screws	20
Thumb nuts	65
Patch bolts	add 40, 10
Cold pressed nuts to 1½ in.	add \$4 50
Cold pressed nuts over 1½ in.	add 7 00

BILLETS

	Per gross ton
Bessemer billets	\$47 50
Open-hearth billets	47 50
O.H. sheet bars	51 00
Forging billets	60 00
Wire rods	57 00

Government prices.

F.O.B. Pittsburgh.

NAILS AND SPIKES

Wire nails	\$5 50	\$5 30
Cut nails	5 85	5 65
Miscellaneous wire nails		60%
Spikes, ¾ in. and larger		\$7 50
Spikes, ¼ and 5-16 in.		8 00

ROPE AND PACKINGS

Drilling cables, Manila	0 39
Plumbers' oakum, per lb.	0 10
Packing, square braided	0 38
Packing, No. 1 Italian	0 44
Packing, No. 2 Italian	0 36
Pure Manila rope	0 37
British Manila rope	0 31
New Zealand hemp	0 31
Transmission rope, Manila	0 43
Cotton rope, ¼-lb. and up	0 74

POLISHED DRILL ROD

Discount off list, Montreal and Toronto	net
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Steel Castings

Quick Deliveries

We Specialize in

High-Grade Electric Furnace Steel Castings

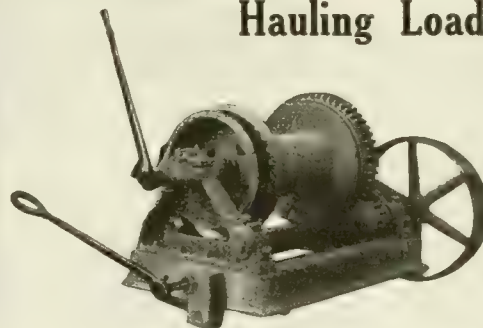
*Let us quote for your
requirements*

**The Thos. Davidson Mfg. Co.
Limited**

Steel Foundry Division :
Lachine Canal, Que.

Head Office :
187 Delisle St., Montreal

For Hoisting Heavy Materials or Hauling Loaded Cars



Made in
7 Sizes

10 H.P.
15 "
20 "
25 "
32 "
40 "
" 02

Made with two drums also if desired.

We can also supply this Hoist geared for
direct connection with an Electric Motor.
Let us send you photograph or catalogue.

May we submit a tender on your Castings
and Steel Plate Work?

Marsh Engineering Works, Limited

Established 1846

Belleville, Ontario

Sales Agents: Mussels Limited, Montreal
Winnipeg and Vancouver

Free Tool Grinding Chart

Grind your cutting tools in exactly the right way
to get best results—and you save time. That's
obvious. It is precisely that that this Tool Grind-
ing Chart enables you to do.

It has been adopted as standard by many firms that found it a
long way better than guess work.

CANADIAN MACHINERY would like to see this Chart in every
shop in the Dominion. Mail the coupon below for your copy to-day.

*Shows at a glance
Correct Clearance
and Rake Angles
for Cutting Tools*

CANADIAN MACHINERY,

153 University Avenue, Toronto.

Please send ^{me}_{us} free, one of your tool grinding charts.

Signed.....

Firm Name.....

St. Address.....

City.....

Prov.

MISCELLANEOUS

Solder, strictly	0 43
Solder, guaranteed	0 45
Babbitt metals	18 to 70
Soldering coppers, lb.	0 58
Lead wool, per lb.	0 16
Putty, 100-lb. drums	6 75
White lead, pure, cwt.	17 80
Red dry lead, 100-lb. kegs, per cwt.	15 50
Glue, English	0 35
Tarred slater's paper, roll	1 30
Gasoline, per gal., bulk	0 33
Benzine, per gal., bulk	0 32
Pure turpentine, single bbls., gal.	1 10
Linseed oil, raw, single bbls.	1 70
Linseed oil, boiled, single bbls.	1 73
Plaster of Paris, per bbl.	4 50
Sandpaper, B. & A.	List plus 43
Emery cloth	list plus 37½
Sal Soda	0 03½
Sulphur, rolls	0 05
Sulphur, commercial	0 04½
Rosin "D," per lb.	0 07
Rosin "G," per lb.	0 08
Borax crystal and granular	0 14
Wood alcohol, per gallon	2 00
Whiting, plain, per 100 lbs.	2 50

CARBON DRILLS AND REAMERS

	Per Cent.
S.S. drills, wire sizes up to 52	35
S.S. drills, wire sizes, No. 53 to 80	40
Standard drills to 1½ in.	40
Standard drills, over 1½ in.	40
3-fluted drills, plus	10
Jobbers' and letter sizes	40
Bit stock	40
Ratchet drills	15
S.S. drills for wood	40
Wood boring brace drills	25
Electricians' bits	30
Sockets	40
Sleeves	40
Taper pin reamers	net
Drills and countersinks	list plus 40
Bridge reamers	50
Centre reamers	10
Chucking reamers	net
Hand reamers	10
High speed drills, list plus	75
High speed cutters, list plus	40

COLD ROLLED SHAFTING

At mill	list plus 40%
At warehouse	list plus 60%
Discounts off new list.	Warehouse price at Montreal and Toronto

IRON PIPE FITTINGS

Malleable fittings, class A, 20% on list; class B and C, net list. Cast iron fittings, 15% off list. Malleable bushings, 25 and 7½%; cast bushings, 25%; unions, 45%; plugs, 20% off list. Net prices malleable fittings; class B black, 24½c lb.; class C black, 15½c lb.; galvanized, class B, 34c lb.; class C, 24½c lb. F.O.B. Toronto.

SHEETS

	Montreal	Toronto
Sheets, black, No. 28..	\$ 8 00	\$ 7 50
Sheets, black, No. 10..	10 00	8 50
Canada plates, dull, 52 sheets	9 00	9 15
Can. plates, all bright.	9 50	10 00
Apollo brand, 10½ oz. galvanized		
Queen's Head, 28 B.W.G.		
Fleur-de-Lis, 28 B.W.G.		
Gorbal's Best, No. 28..		
Colborne Crown, No. 28		
Premier, No. 28 U.S..		10 70
Premier, 10½ oz.		11 00
Zinc sheets	20 00	20 00

PROOF COIL CHAIN

¼ in., \$14.35; 5-16 in., \$13.85; ¾ in., \$13.50; 7-16 in., \$12.90; ½ in., \$13.20;

\$13.00; ¾ in., \$12.90; 1 inch, \$12.65; Extra for B.B. Chain, \$1.20; Extra for B.B.B. Chain, \$1.80.

ELECTRIC WELD COIL CHAIN B.B.

¾ in., \$13.00; 3-16 in., \$12.50; ¼ in., \$11.75; 5-16 in., \$11.40; ½ in., \$11.00; 7-16 in., \$10.60; ½ in., \$10.40; ¾ in., \$10.00; ¾ in., \$9.90.

Prices per 100 lbs.

FILES AND RASPS.

	Per cent.
Globe	50
Vulcan	50
P.H. and Imperial	50
Nicholson	32½
Black Diamond	32½
J. Barton Smith, Eagle	50
McClelland, Globe	50
Delta Files	20
Disston	40
Whitman & Barnes	50

BOILER TUBES.

Size.	Seamless	Lapwelded
1 in.	\$36 00	\$ 00
1½ in.	40 00	00
1½ in.	43 00	36 00
1½ in.	43 00	36 00
2 in.	50 00	36 00
2½ in.	53 00	38 00
2½ in.	55 00	42 00
3 in.	64 00	50 00
3½ in.	58 00	50 00
3½ in.	77 00	60 00
4 in.	90 00	75 00

Prices per 100 ft., Montreal and Toronto.

OILS AND COMPOUNDS.

Castor oil, per lb.	
Royalite, per gal, bulk	18½
Palacine	21½
Machine oil, per gal.	26½
Black oil, per gal.	15
Cylinder oil, Capital	49½
Cylinder oil, Acme	39½
Standard cutting compound, per lb.	0 06
Lard oil, per gal.	\$2 60
Union thread cutting oil antiseptic	88
Acme cutting oil, antiseptic	37½
Imperial quenching oil	39½
Petroleum fuel oil	13½

BELTING—NO. 1 OAK TANNED.

Extra heavy, single and double..	30%
Standard	30, 10%
Cut leather lacing, No. 1	2 20
Leather in sides	1 75

TAPES.

Chesterman Metallic, 50 ft.	\$2 00
Lufkin Metallic, 603, 50 ft.	2 00
Admiral Steel Tape, 50 ft.	2 75
Admiral Steel Tape, 100 ft.	4 45
Major Jun. Steel Tape, 50 ft.	3 50
Rival Steel Tape, 50 ft.	2 75
Rival Steel Tape, 100 ft.	4 45
Reliable Jun. Steel Tape, 50 ft.	3 50

PLATING SUPPLIES.

Polishing wheels, felt	3 25
Polishing wheels, bull-neck..	2 00
Emery in kegs, American..	07
Pumice, ground	3½ to 05
Emery glue	28 to 30
Tripoli composition	06 to 09
Crocus composition	08 to 10
Emery composition	08 to 09
Rouge, silver	35 to 50
Rouge, powder	30 to 45

Prices Per Lb.

ARTIFICIAL CORUNDUM

Grits, 6 to 70 inclusive	.08½
Grits, 80 and finer	.06

BRASS.

Brass rods, base ½ in. to 1 in. rod..	0 38
Brass-sheets, 24 gauge and heavier, base	0 43

Brass tubing, seamless	0 46
Copper tubing, seamless	0 48

WASTE.

White.	Cts. per lb.
XXX Extra.. 20	Atlas .. 18½
Peerless 21	X Empire ... 17½
Grand 19¾	Ideal 17½
Superior ... 19¾	X press 16
X L C R ... 18½	

Colored.

Lion 15	Popular 12
Standard ... 13½	Keen 10½
No. 1 13½	

Wool Packing.

Arrow 25	Anvil 15
Axle 20	Anchor 11

Washed Wipers.

Select White. 11	Dark colored. 09
Mixed colored 10	

This list subject to trade discount for quantity.

RUBBER BELTING.

Standard ... 10%	Best grades .. 15%
------------------	--------------------

ANODES.

Nickel	.58 to .65
Copper	.38 to .45
Tin	.70 to .70
Zinc	.18 to .18

Prices Per Lb.

COPPER PRODUCTS.

	Montreal	Toronto
Bars, ½ to 2 in.	42 50	43 00
Copper wire, list plus 10		
Plain sheets, 14 oz., 14x60 in.	46 00	44 00
Copper sheet, tinned, 14x60, 14 oz.	48 00	48 00
Copper sheet, planished, 16 oz. base	46 00	45 00
Braziers, in sheets, 6x4 base	45 00	44 00

LEAD SHEETS.

	Montreal	Toronto
Sheets, 3 lbs. sq. ft.	\$13 25	\$13 25
Sheets, 3½ lbs. sq. ft.	13 25	13 25
Sheets, 4 to 6 lbs. sq. ft.	12 50	12 50
Cut sheets, ½c per lb. extra.		
Cut sheets to size, 1c per lb. extra.		

PLATING CHEMICALS.

Acid, boracic	\$.25
Acid, hydrochloric	.06
Acid, nitric	.14
Acid, sulphuric	.06
Ammonia, aqua	.23
Ammonium carbonate	..
Ammonium, chloride	.55
Ammonium hydrosulphuret	.30
Ammonium sulphate	.15
Arsenic, white	.27
Copper, carbonate, annhy	.50
Copper, sulphate	.22
Cobalt, sulphate	.20
Iron perchloride	.40
Lead acetate	.35
Nickel ammonium sulphate	.25
Nickel carbonate	.32
Nickel sulphate	.35
Potassium carbonate	1.80
Potassium sulphide (substitute)	2 25
Silver chloride (per oz.)	1.45
Silver nitrate (per oz.)	1.20
Sodium bisulphite	.15
Sodium carbonate crystals	.05
Sodium cyanide, 127-130%	.40
Sodium hydrate	.22
Sodium hyposulphite, per 100 lbs.	6.00
Sodium phosphate	.18
Tin chloride	1.75
Zinc chloride, C.P.	.80
Zinc sulphate	.15
Prices per lb. unless otherwise stated.	

45,000 SHOWERS

A Manufacturer Gives the Details of Filling a U.S. Government Order for 45,000 Shower Heads, Using Geometric Die Head and Collapsing Taps.

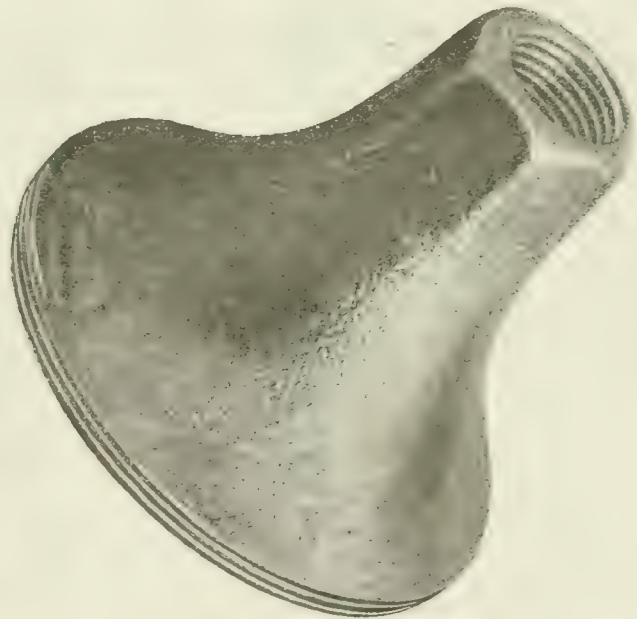
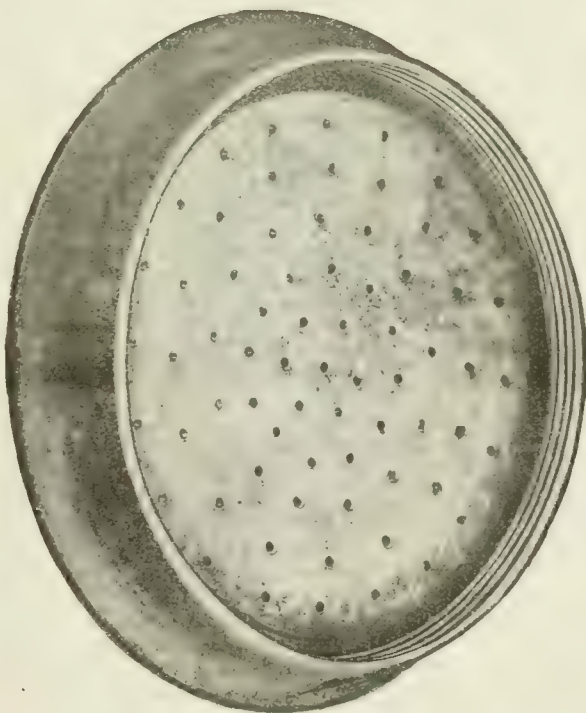
"On the main thread of the shank 3 $\frac{3}{8}$ "-16, we average 230 per hour, with a surface speed of about 400 feet per minute. On the pig iron end we averaged 220 per hour, with a surface speed of about 200 feet per minute. This speed may seem a little low, but we cut this down in order to get a quicker handling of the work. We handled these in air chuck, and in releasing air chuck the

work automatically dropped to a box below.

"On the face, tapped 3 $\frac{3}{8}$ "-16, we averaged 210 per hour, with a surface speed of about 400 feet per minute.

"We were very much pleased with the Geometric tools on this work, especially with the chasers, as we completed 30,000 showers, male thread, with one set of these chasers."

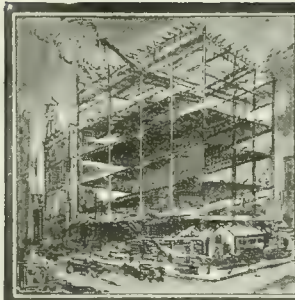
Try a Geometric Thread-Cutting Die Head or Collapsing Tap on your work, and be equally pleased.



The Geometric Tool Company
New Haven, Conn., U.S.A.

CANADIAN AGENTS:

Williams & Wilson, Ltd., Montreal; The A. R. Williams Machinery Co., Ltd., Toronto, Winnipeg and St. John, N.B.



INDUSTRIAL NEWS

NEW SHOPS, TENDERS AND CONTRACTS
PERSONAL AND TRADE NOTES



ENGINEERING

Bridge Collapses at Teeswater, Ont.—

The new cement arch bridge on Con. 15 and 16, in Normanby that was built last summer by contractors Clarke and Cole, of Owen Sound, collapsed on the 7th inst. The span was seventy feet. The plan was prepared by O. L. Surveyor McDowell, of Owen Sound. The foundation was bad and unsuited to a concrete bridge.

St. Andrew's Hospital. — Although

military and public works officials state they have received no official word that the Dominion Government has abandoned the \$2,000,000 St. Andrew's Hospital scheme which called for the erection of thirty buildings, it is rumored among contractors in the city that the proposition has been dropped. Tenders were called on December 12, but Mr. Hastings, Clerk of Public Works for Toronto, states that he has received no notice that the tenders have been accepted. The St. Andrew's College property cost the Dominion Government \$500,000.

armament and \$20,000 for Henry Ford's profit, thus the items of profit, cost of hull and machinery and the outlay for ordnance mount up to \$532,000. The changes that will have to be made on the Atlantic coast before the boats are really ready for service will easily bring the total to \$550,000, it is estimated."

MARINE

Captain George W. Purdy, of Plymouth, Yarmouth county, reached his home last week after an absence of over six years.

Montreal.—The annual report of the Manchester Liners, Limited, of Manchester, England, has been received here. At the outbreak of the war the fleet consisted of fifteen steamers, and of this number eight were sunk by mine or submarine. Five steamers were purchased and two built to replace the losses, the year's work proving very satisfactory.

Captain Purdy was, previous to the outbreak of the war, master of the Battle Line steamer "Pandusia," of St. John, which ship arrived at Hamburg just a day or so prior to the declaration of war. Within two or three days after the declaration Captain Purdy and his first officer, Captain S. S. Patterson, of Port La Tour, N.S., were with many others taken prisoners, and have ever since been held as such, although several at one time or another have been exchanged.

Montreal.—The owners of the steamer Heathcote, the Dominion Shipping Co., have been awarded \$183,354, including interest, for her loss following a collision with the ship Kelbergen in the Bay of Fundy in July, 1917. The owners of the Kelbergen, Messrs. Furness, Withy & Co., have been condemned to pay this amount according to a finding by W. S. Walker, K.C., deputy registrar of the Admiralty Court, confirmed by Mr. Justice McLennan. The assessors were Thomas Robb of the Shipping Federation and Thomas Hall of the Hall Engineering Works, Montreal.

London, Eng.—Sir Joseph MacLay, the Minister for Shipping, pointed out recently that the ending of hostilities had eased the shipping position enormously and had permitted tonnage available for bringing imports to the British Isles to be increased by something equivalent to 10,000,000 tons of goods per annum. Shipping losses having ceased and the output of tonnage continuing to in-

WANT TO INVESTIGATE THE FORD CONTRACT FOR THE EAGLE BOATS

CONSIDERABLE interest attaches to the story that Henry Ford's contract for Eagle boats will be investigated. Senator Lodge calls for the investigation, and from the nature of the charges it would seem likely that Lodge's request will be allowed. Of course, there may be motives of purely political character behind the move. The Canadian Ford plant is in no way concerned with the rumpus that seems to be looming at Washington.

A despatch from Washington, referring to the matter, says:—

Senator Lodge introduced into the Record extracts from the series of articles now current in the "Daily Iron Trade," a publication devoted to iron and steel industries of the great lakes region, in which the deliberate charge was made that the Ford contract to build the Eagle boats was wasteful to the last degree, that the need for boats had long passed and that opportunity for profiteering to a hitherto unsuspected limit reposed in the exceedingly favorable contract which Mr. Ford holds with the Government.

Basis for the Demand

The article which Senator Lodge used as the basis for his demand for the investigation was in part as follows:

"The cost of the Eagle boats originally was placed at \$275,000, or \$500 a ton without guns. The estimate cost now is \$400,000, or \$800 a ton. The cost of ordnance comes to \$112,000 a boat. Under the contract agreement the Ford Motor Company is to be paid \$20,000 over the actual cost if the cost of the hull and machinery exceeds \$275,000. Twenty-five per cent. of any saving under \$275,000 is to be paid the Ford Motor Company in addition to the \$20,000.

"The contract reads, 'The contractors shall use every endeavor to deliver the first of said vessels within five months from the date of this contract, March 1, 1918, ten boats within one month thereafter, twenty boats within the next following month and twenty-five boats a month thereafter.'"

The article which Senator Lodge introduced into the Record draws the deadly parallel between this highly advantageous contract and the pacifist utterances of Henry Ford in which he said he would not accept a cent of profit out of his war contracts. The article continued:

"Had the late candidate for the Senate lived up to his contract ninety-three Eagles would have been completed and in commission by December 15. As a matter of fact exactly seven had been completed by that date, three being in New London, Conn., and four somewhere between Detroit and New London, and of these seven six were rushed to the coast leaking and generally incomplete to get them out before the freeze (of Lake Erie)."

Says First Boat Leaked

The article declares that "the first Eagle leaked badly and not until she was electrically welded did she become water tight." The first Eagle was launched July 11, 1918, but could not start for the Atlantic coast until November 4.

"Most of these intervening 116 days were spent remedying the poor riveting and other defects in the hull," the article asserts. "Originally estimated to cost only \$275,000 or thereabouts this figure now has been increased to \$400,000. On top of this comes \$112,000 each for



Dominion Friction Surface Belting

**Conserves Power and Labor,
Increases Production, and
Cuts Manufacturing Costs**

The lowest possible manufacturing cost is obtained only through highly efficient equipment that will conserve power and labor and "speed up" production.

Dominion Friction Surface Belting is the most economical and efficient transmission equipment obtainable.

Dominion Friction Surface Belting is more than waterproofed fabric—it conserves power by taking a "bull-dog" grip on the pulleys, that practically eliminates slipping and transmits the maximum force that can be transmitted by a belt.

The economy, uniformity and dependability built into each foot of Dominion Friction Surface Belting insure long and continuous service, which saves much time, energy, trouble and worry for employees, and prevents idle machines by removing the cause of transmission troubles.

Dominion Friction Surface Belting "speeds up" production by giving long and continuous service—by conserving power and labor and insuring satisfied operators.

In the
largest
Paper Mills
Flour Mills
Steel Plants
Sugar
Refineries
Textile
Mills
Grain
Elevators
Railway
Shops
Machine
Shops
Saw Mills
Power
Houses
Cement
Mills
Automobile
Plants
Quarries
Mines
and wherever
Transmission
is required.

Our belting engineers can help to cut your manufacturing costs just as they have helped other manufacturers.

One of our service branches is within phone call of your plant—your request for advice places you under no obligation.

Service Branches:

Halifax	Toronto	Fort William	Edmonton
St. John	Hamilton	Winnipeg	Calgary
Quebec	London	Brandon	Lethbridge
Montreal	Kitchener	Regina	Vancouver
Ottawa	North Bay	Saskatoon	Victoria



crease," said Sir Joseph, "the position grows easier day by day. The time is not far distant when it will be possible to release tonnage from requisition on a substantial scale and thereby create a free market in tonnage and freight.

Steamer Morden Makes Record.—The big Canadian steamer, W. Grant Morden, of which Capt. Geo. Pearson of Owen Sound is master, has made a record showing for the season, and her freight earnings for the last round trip will be the largest ever made by a lake freighter. The steamer left Buffalo early in the month for Duluth with a cargo of hard coal, and was due back at Buffalo on Monday or Tuesday with a load of grain. The Morden took about 13,000 tons of coal on the upbound trip, at \$1.15 a ton, and on the run down she has 450,000 bushels of wheat, for which she will receive 7c a bushel. The freight on the latter cargo is, therefore, about \$31,500, and figuring on the coal at \$13,000, she will earn about \$44,500 on the round trip. The Grant Morden holds the record for the largest tonnage to go through the Soo Canal.

Halifax, Jan. 1.—Capt. E. Craddock of the steamer "War Taurus," lying at De-wolf's wharf, this city, was accidentally shot in the back this morning while attempting to quell a disturbance on board the ship. The Captain was rushed to a hospital, where he is now being operated upon, and all the members of the crew, numbering 20, were taken to the police station for examination. According to the agents of the steamer, a number of the men attempted to raid the ship's stores this morning. The steward in charge communicated with the Captain, who, after ordering the men to disperse, handed his revolver to the first officer, telling him to use it if the men refused to obey orders. A scuffle followed, and in the excitement the Captain was shot in the back, the bullet entering his body near the spine.

The "War Taurus" was built in Toronto, and this was her maiden trip.

MUNICIPAL

Toronto.—On the return of the Harbor Commissioners from Ottawa, it was announced that the Government, through Hon. Frank Carvell, had signified its intention of proceeding directly with the work on the eastern end of the harbor. The park and boulevard at the western end will be carried through, and next year the work will be in full swing from Ashbridge's Bay to the Humber.

Tottenham, Ont., has recently passed a by-law for the establishment of a commission for the administration of all works undertaken by the corporation for the distribution and supply of electrical energy consequent upon the contract entered into with the Hydro-Electric Power Commission of Ontario. A vote will be taken in January for the election of two of the members of the Commission.

PERSONAL

Major F. L. C. Bond has been appointed chief engineer of the Grand Trunk Railway system with headquarters at Montreal.

One of the Greatest Men of the War—although but little has been said of him—is Captain E. P. Jesop, of the United States Navy. Capt. Jesop put 500,000 men in France, saved the United States some \$20,000,000, and put the German interned ships into operation a year ahead of the time anybody had a right to calculate that they could be put into commission. Captain Jesop did it all with an idea. The idea was that the broken parts of the engines of the German ships could be repaired by electric welding.

Major Bond, who succeeds Mr. H. R. Safford, recently appointed engineering assistant to the regional director of the central western district, United States railroad administration, has just returned from overseas after two years' service with the 10th Battalion Canadian Railway Troops. He was born in Montreal in 1877. He was educated at Montreal High School, the Collegiate Institute and McGill University. Upon graduating from McGill in 1898, he en-

tered the service of the Grand Trunk as assistant resident engineer of the eastern division, and in 1901 was appointed engineer in charge of double track construction. In 1902 he was night superintendent on the construction of the Park Avenue tunnel of the New York subway, but returned to the Grand Trunk as resident engineer, eastern division, a position which he held until 1913. From 1913 to 1916, when he went overseas, Major Bond was division engineer, eastern lines. He holds a high reputation in railway and engineering circles and his work with the Canadian expeditionary force won the highest commendation.

TRADE GOSSIP

Vancouver, B.C.—Mr. G. D. Swann, consulting engineer for the Dominion Government, has investigated the harbor facilities of Victoria and Vancouver in connection with the placing of orders for steel ships.

Coal Production in B.C.—A decrease in production of coal in British Columbia during November amounted to approximately 49,476 tons, as compared with the October total. The falling off is



Lieut. Lloyd M. Archibald of the Royal Flying Corps, well-known representative of the Dart Union Company of Toronto, as he appeared as a prisoner of war in Germany (on the right). Word has just

been received by his brother, Charles P. Archibald, of Charles P. Archibald & Co., machinery dealers, Montreal, announcing his safe arrival in England after being a prisoner in Germany for over a year.

ALGOMA

Structural Steel—Merchant Bars

Blooms, Billets and Slabs

Concrete Reinforcing Bars

*Shafting - Pulleys -
Hangers*

*Iron, Brass and
Bronze Castings*

Steel Rails—*Open Hearth Quality*

All Sections from 12 lbs. to 100 lbs. per yard

Splice Bars

Steel Tie Plates

*Sulphate of Ammonia
Sulphuric Acid Nitre Cake*

PIG IRON

Basic

Foundry

Bessemer



ALGOMA STEEL CORPORATION, LIMITED
SAULT STE. MARIE, ONTARIO

attributed chiefly to the lower output of the Island collieries, caused principally by the Spanish influenza epidemic. November production is estimated at 168,006 tons, as against 217,482 tons for October. For the eleven months ending November production in British Columbia amounts to 2,372,161 tons, which is 222,186 above the 1917 record.

Promoting Empire Trade.—Measures are being taken by the "Bulletin" of the Imperial Institute to familiarize tanners in the British Empire with the good qualities of the Indian hides. Before the war these hides were collected by German agents and were exported principally to German tanneries. Investigation has been made regarding the possibility of finding British markets for the Indian raw materials, and information is given out to the representatives of the leather industry so that this trade can be kept within the Empire when normal conditions are restored.

New Premises.—The Vanadium-Alloys Steel Company of Pittsburgh, and Latrobe, Penn., manufacturers of high speed and alloy tool steels, have leased the offices and warerooms at 566-568 West Randolph street. This company will carry in Chicago a large stock of "Red Cut Superior" high speed steel in all the standard sizes and shapes of bar stock, also treated bits for tool holders. Owing to the size of their new warerooms, the Vanadium-Alloys Steel Company will now carry a much larger stock than formerly with which to serve their many customers in Chicago and contiguous territory.

Hamilton's Output.—Hamilton munition plants turned out 3,471,425 shells during the war for the allied forces. The largest output of individual shells was that of the Dominion Steel Foundries, which turned out 1,316,430 18-pounder shrapnel shells. The heaviest shells manufactured here were the 60-pounder high-explosive shells, manufactured by the Canadian Westinghouse, Limited, and the Sawyer-Massey Company. Nine local plants turned out 18-pounders, the production of which far exceeded that of any other kinds. Manufacture of munitions in Hamilton began in 1915 and ceased in December, 1918.

Shell Boxes for Municipalities.—Sir Joseph Flavelle, Chairman of the Imperial Munitions Board, when spoken to in connection with his gift of 134,000 shell boxes to the city of Ottawa, stated that a similar course was being adopted in regard to other cities and towns throughout the Dominion. At the present time there were surplus supplies of boxes at forty different points, ranging in number from 200 to 150,000. All these would be presented to the municipalities in which they were located. Sir Joseph said there would be no demand for these boxes now that all munitions manufacturing in Canada had ceased, and that to store them was out of the question.

London, Eng.—Lloyd Harris is visiting the Continent to look over the situation in Belgium and France and to confer with the Governments of those countries. Large supplies of all kinds are needed

for rebuilding in the ruined areas and for equipping national industries, and there is sound ground for expecting that a considerable proportion of these goods will be bought in Canada, the Government in each case being the purchaser and assuming responsibility for all payments. There would appear to be openings for Canadian trade in the Balkans and Roumania. As for trade generally between Canada and Great Britain there is every indication that it will develop rapidly on normal business lines once restrictions upon imports are removed.

British Enterprise in Reconstruction.

—In order to minimize waste, the vast bulk of war machinery in Britain is being adapted to the requirements of commerce. The Ministry of Munitions is buying, selling, and transporting machinery from useless districts to productive areas. The new productive scope of the machinery is enormous. The big pre-war firms are not only already engaged in fulfilling pre-war orders for such things as motor lorries, but are also carrying into effect schemes for the production of agricultural machinery, sewing machines, watches, clocks, and cheap motors. The shortage of prism glasses also has led, he says, to the installation of a plant for the manufacture of huge quantities of finer glasses even than the pre-war Zeiss.

Object to New Rate.—The Transportation Department of the Canadian Manufacturers' Association has issued a circular inviting discussion on the proposed increase in express rates which will come up before an official government body in March.

The changes in express charges are dealt with in the circular as follows:

"The Express Traffic Association for Canada, on behalf of the express companies, have applied to the Board of Railway Commissioners for authority to increase their rates an average of 25 per cent. west of Sudbury and 37 per cent. east of Sudbury over the present rates per 100 pounds.

"Shipments weighing 100 pounds or more now move under rates per 100 pounds generally based on the distance the shipment travels. The application proposes three schedules (instead of six as at present) of rates per 100 pounds.

"As is well known, in the past three years the railways have been allowed to increase their rates approximately 50 per cent. in Eastern Canada, and over 25 per cent. in Western Canada, during which time there have been no increase in express rates. This has had the effect of throwing traffic, formerly carried by freight, on the express companies, taxing their facilities and materially decreasing the efficiency of the service. The return to normal conditions, however, should assist to a great extent in re-establishing an adequate service."

Payment for War Contracts.—A meeting was recently held at Cleveland in which a number of Canadian manufacturers are interested. The gathering included representatives of 200 or more firms from both sides of the line that had been engaged in turning out war material for the American Government or-

der. The object of the meeting was to urge prompt payment of all outstanding bills in this regard. Unless a speedy liquidation of these accounts, which in all amount to hundreds of thousands, is brought about, some embarrassing positions are anticipated. The manufacturers adopted a resolution recommending the immediate passage of the Dent bill, with necessary amendments to meet the situation; asking Secretary Baker to take immediate steps to check the claims of sub-contractors, and urging the payment of such amounts as may appear to be clearly due. Several present and former members of the Government's War Department, who had participated in placing contracts by phone and verbally at times, attended, and stated their conviction that the Government was under a moral obligation to come forward and make the adjustments as soon as possible. As far as Canadian concerns are interested, the number is not very large in regard to the payment for actual material. Bills for the purchase of plants and equipment will, of course, be more numerous from this side of the line, and a number of large firms are working on their claims for compensation now. It is claimed though, that some firms that have shipped war material to United States, or forged it for treatment here on U. S. order, are experiencing some delay in securing payment for the same. It is claimed that payment for material turned out after the signing of the armistice is illegal, in the strict interpretation of the law, and a special act of Congress will be necessary to provide for liquidating the claims of these manufacturers.

CATALOGUES

The Norton Grinding Company, Worcester, Mass., have issued a Universal Tool and Cutter Grinder book — fourth edition—in which they describe their Universal Tools and Cutter Grinder. The various sizes of this machine are shown and attachments are also illustrated for the handling of almost any class of work which may be desired. Types of work, and set-up for the machine, are given considerable prominence. The various shapes of wheels which may be used with these machines are very clearly shown by a number of line drawings.

The Link Belt Co., Toronto, have issued a catalogue on the equipment for the handling and separation of coal at the mine. Their long connection with this business has enabled them to specialize in the equipment for the handling, separation and loading of coal at the mines. The catalogue shows the various types of coal-handling equipment made by the company and shows many complete installations that they have installed in the past. Eighteen pages are devoted to illustrations showing various coal tipples and loading chutes of various coal companies. The illustrations of complete equipment are followed by detail pictures, which show to good advantage the various types of conveying, sorting and cleaning appar-



The Specifications Call For .00001±

SUPPOSE you were studying the specifications for a big job—one that called for making new and expensive tools—would your present tool-room equipment let you handle it? There are only two kinds of tools—the good and the poor—there's no half-way mark. And the quality of your output is fixed by the degree of accuracy you can obtain in your tool-room.

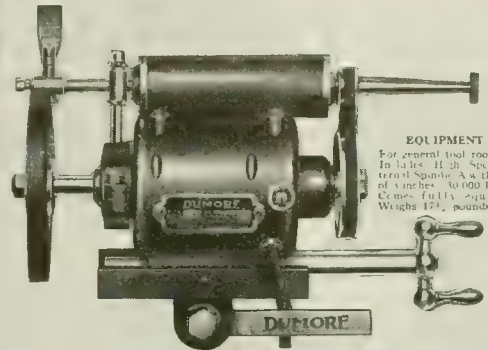
Accuracy in grinding depends upon correct cutting speed and perfect running balance. That is why the **DUMORE** grinder has been given speeds ranging from 10,000 to 50,000 R. P. M., along with a dynamically balanced armature. With this tool in your shops you can eliminate chatter, taper or bell-mouthed grinding. Then, too, the **DUMORE** is portable, easily carried to all parts of the shop and quickly set up in any machine ready for use.

If you are interested in obtaining only the best tools, ask your dealer about the **DUMORE** grinder. If he doesn't carry it, write us for literature and prices.

WISCONSIN ELECTRIC CO.

2907 16th St.

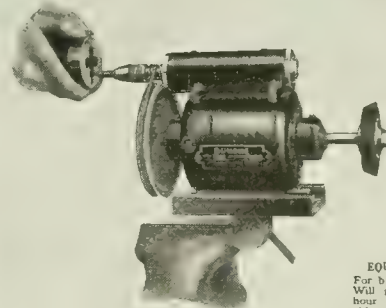
RACINE, WIS.



EQUIPMENT A
For general tool room use
Includes H. S. Speed In-
ternal Spindle Arm with reach
of 10 inches. 40,000 R. P. M.
Comes fully equipped.
Weights 175 pounds



EQUIPMENT B
For deep internal
work. Extension
arm has 10-inch
reach. 10,000 R. P. M.
Arm inter-
changeable with in-
ternal spindle on
Equipment A.



EQUIPMENT C
For button dies
Will grind 10 an-
hour. Interchange-
able with A and B

DUMORE HIGH SPEED **GRINDERS**

atus. Box car loaders are shown, coal feeders and continuous centrifugal driers are illustrated.

The Hanson Clutch and Machinery Co., Tiffin, Ohio, have recently issued two catalogues descriptive of friction clutches and friction clutch pulleys. It is a well known fact that the majority of present day clutches are so large and heavy that they have a tendency to bind the shafts they are mounted on and cause trouble and expense to the users. The patented construction featured by this firm eliminates the cumbersome features of former clutches and permits the installing of an extremely powerful clutch in very restricted locations. Its light weight, small size and neat appearance make it particularly adaptable to as incorporation into machine tools. The booklet on friction clutches describes the principles involved, gives complete dimensions of the various types and makes recommendations as to their various uses. The catalogue dealing with friction clutch pulleys gives complete data regarding the various sizes of standard pulleys in which the clutch is incorporated.

Kelly Reamers and Production Tools is the title of a new catalogue issued by the Kelly Reamer Co., of Cleveland, Ohio. This catalogue is descriptive of the Kelly Floating Reamers and Production Tools with adjustable and replaceable high speed steel blades for machining of steel, iron, bronze and aluminum. They are used extensively in the machining of engine cylinders, crank cases, transmission cases, auto parts, pumps, connecting rods and tools, etc. The many combinations that may be obtained in tools of this type make it impossible for the manufacturer to illustrate and list more than a small portion of them in the pages of the catalogue, but representative types of reamers are described in extensive detail. The principle of operation is very clearly shown and the incorporation of the various units into multiple tools is treated of in a very interesting manner. Various arrangements are shown in which the tools are set up for various operations upon standard makes of machines, and also their use is shown in the operation of single purpose machines for various classes of work.

The Greenfield Machine Company, Greenfield, Mass., has issued catalogue No. 6 dealing with their Universal Tool and Cutter Grinder. The catalogue deals almost exclusively with the various operations which may be performed on this machine. Each operation is illustrated with an engraving and directions are given as to the proper set-up required. The bevel and face mill holder attachment is shown by means of four operations which are done by its use, grinding an angular cutter, grinding the face of inserted tooth cutters, grinding the end of inserted tooth cutters, sharpening counterbores, and sharpening small end cutters. Another attachment which is shown enables butt mills having taper shanks to be readily sharpened. Other illustrations show the sharpening of spiral cutters, grinding formed cutters,

grinding the flutes of taps, grinding the clearance on a reamer, and sharpening the end of a chucking reamer. Cylindrical grinding may readily be performed on the machine, and taper grinding with the same facility. The Universal Vise is one of the most valuable and important attachments furnished with this machine, and considerable information is given as to its use.

The Gisholt Machine Co., Madison, Wis., have issued a new catalogue on the Gisholt Standard Turret Lathe. In this catalogue a departure is made from the usual line of trade literature in that considerable number of pages have been devoted to the illustrating of actual operations performed by the lathe. Close-up views of lathes at work are shown on the first thirteen pages of the catalogue, and it is stated that these photographs selected from a large number of different parts which have been finished on Gisholt machines show just what could be seen if a person stood beside the lathe doing the work. A number of operations shown are, machining gear blanks, machining cast steel wheels for trucks, machining steel gear blanks, and machining malleable iron wagon hubs. The machining of a cast iron truck wheel is taken through its various stages from the first operation to the production of the finished part. The use of the lathe in the machining of motor parts is shown in an illustration which gives a good view of the set-up used in the boring of steel cylinders for aeroplane engines. The mechanical advantages obtained by using the Gisholt Turret Lathe and the economical advantages obtained are gone into thoroughly and this information is followed by general specifications and dimensions together with pictures of the various sizes of the machines. The last part of the book is devoted to standard tools for the lathes, boring bars, reamers, tool holders, and chucks. The turret on the lathes, as well as the motor driven lathes, are illustrated and described.

The Link-Belt Company, Toronto, has issued a new booklet entitled "The Economical Handling of Coal and Ashes and Reserve Coal Storage." This book from the wealth of details and the illustrations it contains is a valuable reference work on the subject. The modern power plant contains much equipment which is the result of real engineering genius, but it is only recently that the boiler-room has begun to receive the attention which it deserves. The development of the electric generator, the steam turbine and its various accessories has proved a greater attraction to inventive genius than the more prosaic problems of fuel saving and labor saving in the boiler-room. As a matter of fact, however, boiler-room savings probably offer greater possibilities than further savings in the generator room. Many of the large power plants are built by corporations employing competent engineers, who are familiar with the best modern practice, and who obtain the co-operation of specialists in selecting and arranging the various parts of the equip-

ment. In many of the smaller plants, however, the owner is apt to rely largely on his own judgment or on the judgment of an architect or engineer whose experience is not broad enough to ensure the best results. To both of these classes of power plant owners the subject matter of this book should prove of unusual interest, as it brings together in a compact form the various systems and devices used for the handling of fuel and ashes. The various types of equipment manufactured by the company are shown and power plant layouts are in all cases given, so that various arrangements of the conveying equipment may be readily seen and understood. The Peck carrier, belt, conveyers, scraper conveyers, and other forms of conveying apparatus are described in detail and weighing devices, measuring apparatus and other apparatus which goes to make up a complete coal and ash handling plant are described and illustrated.

WANTS A CHANCE FOR MANUFACTURER

Guelph Manufacturer Claims There is
Opposition to All Development

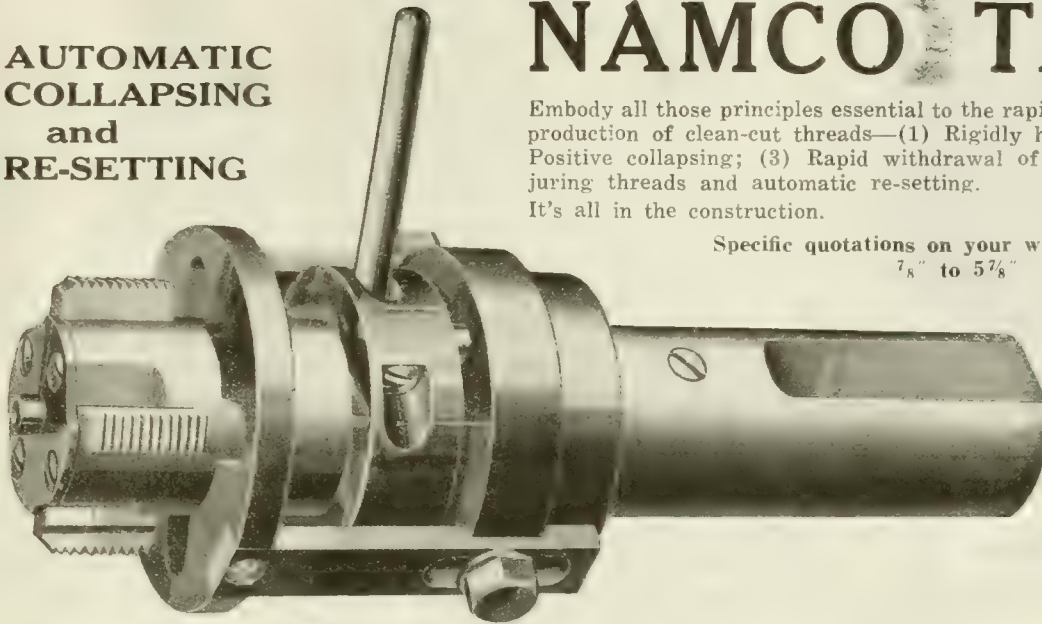
Special to CANADIAN MACHINERY

GUELPH, January 9.—"There is no use denying the fact that there is in Canada a feeling of opposition to the manufacturer." Such was the opinion of Mr. E. Barelman, president and general manager of the Gilson Engine Co. at Guelph. "We have had a good chance to try this out in connection with tractors. It looks now as though it would be better for us to manufacture at our American plant for distribution in Canada, much as we would prefer to do it here. We have been waiting for a number of years now for matters to take a turn in the other direction, but we cannot see any favorable signs. The Canadian manufacturer does not want to put his protection on the back of the farmers who are going to purchase his goods, but he does want to have a chance to work in conditions that are favorable to his development, and he does not like to feel that his every movement is regarded with a certain amount of suspicion."

The Gilson Co. are going ahead, though, turning out tractors of a new type. Their silo department, which was started about three years ago, is feeling the high cost of material as there is a large amount of wood used in the Gilson silo. There is no after-war problem at this shop, and all departments are busy and well employed.

The most successful acid-resisting alloys are those of iron and silicon containing 14 to 15 per cent. of silicon. According to a paper read by Mr. W. C. Carnell before the American Institute of Chemical Engineering, such alloys resist the action of nitric and sulphuric acids of all strengths, and also are proof against atmospheric corrosion. In the acid industry this alloy is much more efficient than stoneware.

AUTOMATIC COLLAPSING and RE-SETTING



NAMCO TAPS

Embody all those principles essential to the rapid and economical production of clean-cut threads—(1) Rigidly held chasers; (2) Positive collapsing; (3) Rapid withdrawal of tap without injuring threads and automatic re-setting. It's all in the construction.

Specific quotations on your work. Capacities,
7/8" to 5 7/8"

THE NATIONAL ACME COMPANY

New England Plant
WINDSOR, VERMONT

CLEVELAND, OHIO

Canadian Plant
MONTREAL, P.Q.

Branch Offices: New York, Boston, Chicago, Detroit, Atlanta, San Francisco
Representatives in Foreign Countries

Makers of Gridley Single and Multiple-Spindle Automatics at Windsor, Vermont and Acme Automatics, Threading Dies, Collapsing Taps and Screw Machine Products at Cleveland, Ohio

DEAL GENEROUSLY WITH EMPLOYEES

Canadian Cartridge Co. at Hamilton
Have Closed as Munitions
Plant

HAMILTON.—Last Monday the Canadian Cartridge Company, as a shell plant, virtually closed its doors, and ceased to manufacture munitions. This is only one of the many plants here which has discontinued shell operations, but it is the only one to date that has been compelled to close down. Many other concerns which have been working on war material have reverted back to their pre-war lines and are building up large stocks in anticipation of large export business. Indications show that very large quantities of machinery, stoves, kitchen ware, wire, wire nails, roofing, tacks of all descriptions, and other commodities in daily use will be shipped to Siberia, while negotiations are under way to increase the export trade to South America.

The Canadian Cartridge Company, since the beginning of hostilities, have been manufacturing cartridge cases of various classes and on Monday last finished the last case of the anti-aircraft class for the United States Government. During the many months of war the company has been more than good to their men, and directly of great value to the Dominion. The profits on their orders were in a way divided with the

men, this on the bonus plan, which was a very high rate. In order to stimulate production and keep their staff at the highest possible speed during the shortage of shells, the company offered inducements by way of special bonuses for every hundred cases produced over a given amount, and placed that amount within reason. Thus it was that the Cartridge Company won an enviable reputation.

Mr. Alex. Petrie, connected with the company, stated that the closing of the plant was for only a very short period, during which the company would carry on experimental work along the line of steel barrel manufacturing, and with the completion of that work would open their plant and commence operations.

When the company found it necessary to dismiss their shop staff they donated to each one a month's wages, and paid the wages and bonus due. This was in addition to a Christmas gift of \$25 to each of the staff, and ten and fifteen dollars to each employee, according to his length of service.

The officials would not predict as to the possible length of time they would be closed, but indications would point to it being some months before they would again be operating.

Trade With Argentina.—Jorge Mitre, editor and publisher of "La Nacion," Buenos Ayres, who spent a few days in Toronto, said in reference to trade with Argentina: "Argentina should be a good market for both Canada and the

**Rubber
Making
Plant**

BERTRAMS LIMITED
SCIENNES EDINBURGH

Manufacturers of Machinery for Rubber Mills, Paper Mills, Linoleum Mills, and Machine Tools for Iron and Steel Constructional Work.

OVENS

BRANTFORD OVEN & RACK CO., LTD.
BRANTFORD, CANADA.

Japanning and Varnishing Ovens heated by Gas, Electricity, Steam or Coal.
Kerothen Siphonage Ventilators, Bakers' Ovens, trucks, casters, etc.
Write for Booklet.

CASTINGS

Medium Weight Grey Iron, Brass, Etc.

GREENLEAFS, LIMITED

Belleville, Ontario

United States. Our country is not a manufacturing country, but it is a good spending country. It is not a manufacturing country because we have no minerals, and while we have some large cities—Buenos Ayres is a cosmopolitan city of three millions—the chief production is in agriculture. Naturally, there is a good market for agricultural implements. We obtain all our pulp and paper from Canada now. There are many things which I should suppose Canada

"HAWK" D CHROME VANADIUM STEEL

You Know How Greatly it Increased Production

You know how it proved to be without equal for both first and second operation punches—how, in both Canadian and American shell plants, this heat-treated ready-for-use steel enabled each punch to turn out over 2,000 shells.

Hawkrider Brothers' steel for every commercial requirement is just such production-increasing steel as proved this "Hawk" D. Chrome Vanadium. We make

Steel of Every
Description

Hawkrider Brothers Company

303 Congress St., BOSTON, MASS.
U. S. A.

'Barnes-Made' Springs

are unusual in
service and wear.

They are the result of sixty years' experience, unsurpassed equipment and highly skilled workmanship.

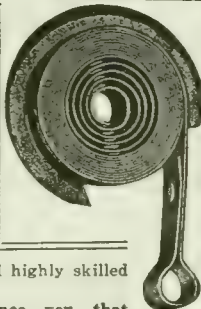
A trial will convince you that "Barnes-Made" Springs are the best buy.

Established 1857.

THE WALLACE BARNES COMPANY

218 South St., Bristol, Ct., U. S. A.

Mfrs of "Barnes-made" Products
Springs, Screw Machine Products, Cold Rolled Steel and Wire



could export to Argentina." Asked as to the question of credits, Mr. Mitre said that the long-time credits formerly given by the Germans would not prevent business on American plans. For one thing, there is now a greater amount of liquid capital ready for investment, so that long credits are not necessary. As to the tariff, this is for revenue purposes only. While agricultural implements are imported free of duty, and other necessities, luxuries are taxed. For instance, pianos pay a reasonable customs tax, though it does not prevent large importations. Mr. Mitre said he had seen Canadian pianos in Buenos Ayres, but more American instruments.

Patents Issued.—The following is a list of Canadian patents recently issued

BRITISH GOVERNMENT RELAXES MANY TRADE RESTRICTIONS

IMPORTANT cable dispatches have been received by Mr. G. T. Milne and Mr. F. W. Field, the British Trade Commissioners at Montreal and Toronto respectively, from the Imperial Department of Overseas Trade in London, pointing out that since the armistice was signed many restrictions on commerce have been withdrawn, while in the case of those which remain licenses are being granted much more freely than previously. Particulars regarding these relaxations will be published weekly in the "Board of Trade Journal," the official organ of the Imperial Government for notices regarding trade.

Orders placed during the war period now have good prospects of being executed, and arrangements for new business should be made without delay.

The following relaxations in particular should be noticed:

1. Permits to manufacture and priority certificates in connection therewith are no longer necessary.
2. Firms are at liberty to accept civil or commercial orders for immediate execution, thus freeing the engineering industry, among others, for commercial work.
3. All the principal kinds of raw materials may now be used for the commercial manufacture of goods for export, but these raw materials themselves may not be exported in certain cases without licenses.

Among those to which this condition applies are the following:—
Aluminum, brass, iron, nickel, steel, antimony, copper, lead, spelter or zinc, tin.

In general, restrictions on the export of manufactured goods have been removed, while they have been retained in the case of raw materials.

The following list indicates the most important items, the export of which was formerly prohibited to all countries, but are now permitted to be exported to any part of the British Empire:—

Articles of aluminum.

Articles—manufactures of asbestos.

Belting, cotton—including belting impregnated with balata or rubber.

through the agency of Messrs. Ridout & Maybee, 59 Yonge Street, Toronto, from whom further particulars may be obtained: Frederick L. H. Sims, internal combustion engine; Asa Mutchenerbacker, sawing machine; Walter R. Morson and E. Beaumont Jarvis, necktie form; John T. Dennis, fuel composition; Harvey J. Miles, intermittent feeding mechanisms for tapes or bands; Edouard Van Brabant, machines for removing flax seed from flax; Appleford Counter Check Book Co., Limited, paper cabinet; James W. Moffat, electric furnace; Alfred T. Snodgrass, the manufacturer of artificial abrasives; James T. King, mouthpieces for brass wind instruments, John E. Pointon, bread-making machinery.

- Bicycles—complete.
 - Bicycle tyres and parts.
 - Boots and shoes (except children's with soles or uppers of leather).
 - Brooms.
 - Brushes (except tooth brushes).
 - Copper—and manufactures of—except wire bars, plates, rods, sheets, stripe tubes.
 - Galvanized sheets—corrugated or flat.
 - Grindstones.
 - Glass for optical instruments.
 - Hand tools for agriculture.
 - Hollowware, domestic—or iron or steel plate.
 - Iron and steel rivets, nuts and screws.
 - Iron and steel wire cloth.
 - Incandescent mantles and rings.
 - Jute cordage and twine, padding and webbing, twist and piece goods.
 - Linoleums.
 - Magnesite and magnesite bricks.
 - Nails (wire).
 - Magnetos and parts.
 - Photographic materials.
 - Rubber manufactures—except surgical gloves.
 - Surgical bandages and dressings.
 - Steel sheets (black).
 - Tools (small).
 - Wagons and carts—and parts.
 - Wool and hair—manufacture; of, not to include raw wool or yarns.
- Certain factors will continue to hamper the export trade, notably (1) shortage or labor till the army is demobilized; (2) shortage of tonnage; (3) the need for reorganization of plant in certain industries before resuming normal work, but it is considered that the effect of these factors will diminish greatly in a few months.

Cleveland.—Four large carriers, to take about 1,500,000 bushels, are chartered to load at Fort William and hold at Georgian Bay ports, and a steamer of 240,000 bushels capacity was placed to load at Chicago for Buffalo. Some owners are figuring in making two more trips in the grain trade. A large quantity of grain will be floated by November 30, when the regular insurance expires, but considerable tonnage will be required for December loading.

Search for graphite deposits in the United States since the war started has brought to light the largest known deposits of high grade mineral on the continent, says the New York State Department of Labor. It is between Lake George and Lake Champlain in the vicinity of Black Mountain. The veins crop out for nearly a mile with a thickness of 50 ft. The graphite content indicates a variation of 6 to 10 per cent. of the large flake variety desired by crucible makers, while a 6 ft. layer assays over 15 per cent. of high grade graphite.

Pyridine is not the only substance which has a high solvent action on coal constituents. Thus, Vignon states that aniline dissolved 23.4 per cent., and quinoline 47.3 per cent.—at boiling point—of a bituminous gas coal from the Loire district, whilst Parr and Hadley record the extraction of 35 to 40 per cent. from "high-volatile" coal, and 20 to 30 per cent. from "low-volatile" coal, by treatment with phenol at 110 deg. Cent. in an atmosphere of carbon dioxide.

MANY SHOPS HAVE NO AFTER-WAR PROBLEMS

Continued from page 50
Canadian firms. "The American has been buying raw material at a price fixed by the War Industries Board, but none of that was for export to the Canadian business. The Canadians had to pay a higher price on this side for their material, and compete in the open market for business. Of course, there is a big demand for tractors and we are selling them as fast as they can be turned out, particularly in Ontario, but the handicap is there just the same and it should be adjusted as quickly as possible."

A decrease in prices of material used in galvanizing was an acceptable thing to this firm, as their windmill business is at all times a big item in the sum total of their trade.

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PATENTS FOR SALE

Two Canadian Patented Steam Specialties for sale; one Steam Trap, Patent Number 187215, and one Steam Separator, Patent Number 183340.

Allentown Experimental Work
Allentown, Pa., U.S.A.

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FOR SALE--1 -36" x 36" x 12' Bertram Planer, single head in first-class condition. 1-64" x 6' Horizontal Boring Miller, single back geared, in good condition. Globe Engineering Co., Ltd., Hamilton, Ont. ctfm

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- 2 20 x 12 American Tool Works Lathes.
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- 2-Racine Power Hack Saws.
- 1-High Speed Drill.
- 2 3 x 36 Jones & Lamson Turret Lathes.
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- 1 Grinder, wheels 18 x 3.
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MECHANICAL AND STEAM ENGINEER open for appointment as plant engineer in an industrial plant or shipyard. Sound practical man with good initiative and executive ability, experienced in the maintenance and installation of medium and heavy machine tools, steam and air lines, transmission, etc. Age 37. Seventeen years' engineering experience, and held position as above in a large shipyard for seven years with marked success. Correspondence invited to Post Office Box 1965, Montreal. (c5m)

WANTED BY A SUCCESSFUL SUPERINTENDENT, a position in Toronto or elsewhere. Can furnish the best of references, both as to character and ability. 16 years' practical experience. 37 years of age. Box No. 535, Canadian Machinery. (c26m)

CHIEF TOOL DESIGNER OF LARGE MANUFACTURING plant open for engagement. Similar capacity or master mechanic. 12 years' experience manufacturing and repair work. Practical mechanic. Age 27. Married. Credentials furnished. Box 534, Canadian Machinery. (c26m)

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WANTED BY A COMPANY PRODUCING crucible cast steel in the United States, a representative in Canada who is thoroughly familiar with the tool steel business, especially High Speed Steel business in Canada. Answering advertisement state previous experience, age and salary wanted. Box 540, Canadian Machinery. (c2m)

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MANUFACTURERS--WE CAN UNDERTAKE work to any specification--munition production equipment or otherwise. Write W. H. Sumbling Machinery Co., 7 St. Mary St., Toronto

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SIX-FOOT RADIAL DRILL FOR BOILER shop; lathe to take in 12' between centers; air hoist, 10" cylinder, 4' lift with trolley; vertical air receiver, 44" inside dia., 14" high. The National Shipbuilding Co., Ltd., Goderich, Ont.

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Take notice that the Bennett & Wright Co., Limited, of Toronto, Canada, duly manufactured the hot water heater covered by Canadian Patent No. 107120 prior to the period called for by the Patent Act, and on application to the undersigned any further orders for the above invention will be filled at a reasonable price. Ridout & Maybee, 59 Yonge St., Toronto, solicitors for Anders B. Reck.



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- 1-28 x 14 Fay & Scott Engine Lathe. Used.
 - 1-30 x 14 P. & W. Standard Engine Lathe. Used.
 - 1-21 x 12 Perkins Racked Engine Lathe. Used.
 - 1-24 x 12 Springfield Ideal H.D. Engine Lathe. New.
 - 1-21 x 10 Porter Standard Engine Lathe. New.
 - 1-20 x 10 W. & B. Gear Head Lathe. Used.
 - 1-18 x 8 LeBlonde Engine Lathe. Used.
 - 1-18 x 8 Springfield Ideal G.B. Tool Lathe. New.
 - 1-16 x 8 L. & S. Q.C. Engine Lathe. Used.
 - 1-16 x 8 Porter Standard Engine Lathe. Used.
 - 1-16 x 8 American Q.C. Engine Lathe. Used.
 - 2-16 x 6 Filsmith Q.C. Lathes. New.
 - 3-15 x 6 South Bend Standard Lathes. New.
 - 1-7" x 12" Precision Bench Lathe. (Porter). New.
 - 1-8" Fitchburg Low Swing Lathe. Used.
- ### TURRET AND SCREW MACHINES
- 1-18 x 6 Springfield Fox B.G. Turret Lathe. Used.
 - 1-14 x 5 Hendy Turret Lathe. Used.
 - 3-12 x 4 Warner & Swasey Turret Lathes. Used.
 - 1-12 x 4 B. & O. Turret Lathe. Used.
 - 1-12 x 4 Peabody Turret Lathe. Used.
 - 2-No. 107 11" Wells & Son Turret Lathes. Used.
 - 1-28" N. B. & P. Rigid Turret Lathe. Used.
 - 1-14" Warner & Swasey Turret Lathe. Used.
 - 2-3 x 36 J. & L. Flat Turret Lathes. Used.
 - 1-No. 2 Warner & Swasey Hand Screw Machine. Used.
 - 1-No. 2 S. & K. Hand Screw Machine. Used.
 - 2-No. 3 S. & K. Screw Machines. Used.
 - 1-24 Cleveland Automatic Screw Machine. Used.
 - 2-20" Cleveland Automatic Screw Machines. Used.
 - 1-No. 616 4-Spindle National Acme Automatic. Used.
 - 4-No. 52 4-Spindle National Acme Automatics. Used.
 - 1-No. 30 4-Spindle National Acme Automatic. Used.
 - 1-4 1/2 Gidley Automatic. Used.

SHAPERS AND MILLERS

- 1-25" Springfield H.D. B.G. Crank Shaper. New.
 - 2-14" Springfield B.G. Crank Shapers. New.
 - 2-14" Milwaukee B.G. Crank Shapers. New.
 - 3-20" Milwaukee B.G. Crank Shapers. New.
 - 1-16" Milwaukee B.G. Crank Shaper. New.
 - 2-20" Columbia Crank Shapers. New.
 - 1-18" Fox Crank Shaper. Used.
 - 1-16" Hendy Geared Shaper. Used.
 - 2-14" Hendy Friction Metal Shapers. Used.
 - 1-No. 1 U.S. Hand Miller. New.
 - 1-No. 1 Garvin Hand Miller. New.
 - 1-No. 1 Burke Bench Miller. New.
 - 1-No. 3 Burke Bench Hand Miller. New.
 - 1-Warner & Swasey Milling Machine. Used.
 - 2-No. 0-B Fox Milling Machines. New.
 - 1-No. 1 Dow B.G. Plain Milling Machine. New.
 - 1-Fosdick 3 1/2" Horizontal Miller. Used.
 - 1-No. 10 Beaman & Smith 3 1/2" Horizontal Miller. Used.
 - 1-60" Bickford Vertical S.H. Miller. Used.
- ### GRINDERS AND PLANERS
- 2-No. 4 Clizbe Bench Casting Grinders. New.
 - 8-No. 3 Clizbe Casting Grinders. New.
 - 3-No. 2 Clizbe Casting Grinders, on stand. New.
 - 1-No. 3 Champion Bench Casting Grinder. New.
 - 3-No. 0 Champion Bench Casting Grinders. New.
 - 1-No. 3 Detroit Floor Casting Grinder. Used.
 - 1-1 1/2 x 45" Standard Low Floor Casting Grinder. Used.
 - 1-No. 14 Double End Pedestal Casting Grinder. Used.
 - 1-Iron Foundry Builders' Pedestal Casting Grinder. Used.
 - 1-S. & S. Casting Grinder on stand. Used.
 - 1-American Drill Grinder. Used.
 - 1-W. & M. Tool Drill Grinder. Used.
 - 1-Washburn Drill Grinder. Used.
 - 1-Yankee Drill Grinder. Used.
 - 2-W. & M. Yankee Drill Grinders. New.
 - 1-No. 20 Landis Plain External Grinder. Used.
 - 1-No. 60 Head Cylinder Grinder. Used.
 - 1-No. 2 1/2 Woods Universal Tool and Cutter Grinder. Used.
 - 1-No. 1 Thomson Universal Tool and Cutter Grinder. New.
 - 1-Cutter and Reamer Grinder. Used.
 - 1-6 A Gorton Universal Disc Grinder. Used.
 - 1-24" Disc Grinder Press. Used.
 - 1-No. 34 Horizontal Disc Grinder. Used.
 - 1-Temco Electric Grinder on Pedestal. New.
 - 1-Temco D Electric Motor Grinder. New.
 - 1-Temco G Bench Electric Grinder. New.
 - 1-Van Dorn Portable Electric Grinder. Used.
 - 1-Hand Electric Grinder. New.
 - 1-P. Tool Electric Grinder. Used.
 - 5-Dumore A.T.P. Grinders. New.
 - 1-Dumore B.T.P. Grinder. New.
 - 2-Dumore G.A.C. Electric Type Grinders. New.
 - 3-Dumore, Jr. Electric Grinders. Used.
 - 1-No. 1 Landis Internal Grinder. Used.
 - 1-Morse Face Grinder. Used.
 - 1-28 x 7 Planer Type Surface Grinder. Used.
 - 1-No. 6 Bryant Chucking Grinder. Used.
 - 1-52 x 45 x 12 3/4 Patch 2 Head Open Side Planer. Used.
 - 1-46 x 40 x 15 1/2 Patch 2 Head Open Side Planer. Used.
 - 1-44 x 34 x 11 1/4 Lincoln 2 Head Open Side Planer. Used.
 - 1-24 x 24 x 6 Wilson Metal Planer. New.

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The special articles in this Review and Outlook Number are prepared by members of the staff of THE FINANCIAL POST and of associate publications in the MacLean group of Specialized Business Newspapers.

Peace Brightens Prospects for Loan Companies
Imperial Oil's Plan Based on Dollars and Cents
Decline in Net Earnings of C.P.R.
Bank Clearings Again Ahead of Last Year
Meeting Client on His Individual Business Ground
Bankers Looking to the Far East
Should Banks Buy Victory Bonds?
Using the Trade Acceptance in Retail Business
Bond Market Has Been Quiet But Very Strong
N. F. U. Organizes Loss Information Service Bureau

(SPECIAL SECTION)

The Government is Organizing a Comprehensive Machine for the Repatriation of Canada's Army
Let Us Have Confidence in Ourselves — Editorial
Banks are Blazing the Trail for Development of Export Trade in Markets of the World
Opportunity for United States to Play Part of "Big Sister" to Canada in a Financial Way
Not so Much a Problem of Who Will Emigrate, But Who Will Prove Desirable to Canada
The Business of Bringing the Boys Back Home
Canada's Borrowings During 1918 Reach a Total That Establishes a New Record
Bond Market Has Experienced Peculiar Year
Beating Swords of War to Plow Shares of Peace
British Can Build Cheaper Vessels Than Canadians
War and the "Flu" Cause Abnormal Death Claims
Canada's Banks and Question of Larger Capital
Now the Stock Exchanges are Taking the Rough Jolts Out of Financial Reconstruction
Canada Made a Remarkable Record in the Production of Shells and Other Munitions
The Menace of the Bolshevik! Insidious Influences Threaten Relations
Price of Wheat and Production of Livestock
Comparative Price Records of Canadian Securities for Past Eight Years
Activity in Renting Workmen's Houses and in Dealings in Farm Lands Distinguishes Realty Market
Steel is King When Nation Goes to War
Canada's Exports and Their part in Beating the Hun
January Dividend Payments
Canada's Part in Beating the Submarine Peril

Above mentioned are a few of the more important contents of this issue of THE FINANCIAL POST. Send a subscription to THE POST and note its business value to you. Use this form in sending subscription which is \$3.00 per year.

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- 1 18 x 8 Ryerson Cincinnati Engine Lathe, 3-step cone, D.B.G., Q.C. gear box.
- 1 20 x 10 Ryerson Cincinnati Engine Lathe, 3-step cone, D.B.G., Q.C. gear box.
- 1 24 x 12 Lodge & Shipley Engine Lathe, 3-step cone, D.B.G., Q.C. gear box.

MILLING MACHINES

- 1 Ryerson-Owen No. 3 Universal, belt drive.
- 1 Ryerson-Conradson No. 3 plain, belt drive.

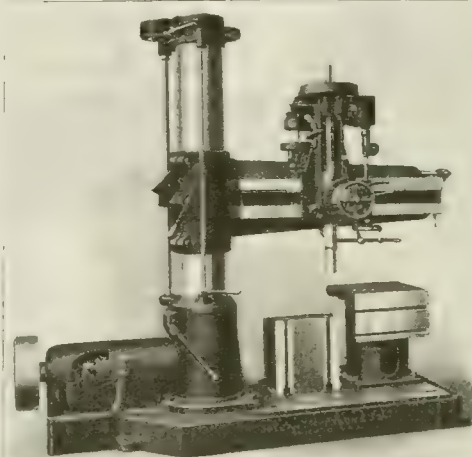
DRILLS

- 3-20" Ryerson Rockwell Sensitive.
- 1-28" Ryerson Sibley Sliding Head.
- 1-4' Ryerson Radial Drill, Gear Box.
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- 1-30" Ryerson Sibley Sliding Head.

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- 1-8' Lennox, Double Housing Type, Splitting Shear, capacity $\frac{3}{4}$ " belt drive.
- 1-Ryerson Steel Frame No. 2 Hand Lever Shear, 6" blades, $\frac{1}{4}$ " capacity.
- 1-Ryerson Steel Frame No. A-6 Hand Lever Punch, 6" throat, capacity $\frac{1}{4}$ x $\frac{1}{4}$.

Ryerson 4' Plain Radial Drilling Machine with gear box drive.



- 1-Ryerson Steel Frame No. C-6 Hand Lever Punch, 6" throat, capacity $\frac{1}{2}$ x $\frac{1}{2}$.
- 1 Ryerson Steel Frame No. 5-A Hand Lever Punch, 3' throat, capacity $\frac{1}{4}$ x $\frac{1}{4}$.
- 1 Ryerson Steel Frame No. O-A Hand Lever Punch, 3" throat, capacity $\frac{1}{4}$ x $\frac{1}{4}$.

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- 10' Bement Vertical Boring Mill, two heads.
- 36" Bausch Vertical Boring Mill, two heads.
- 48" x 48" x 12' D. & H. Open-side Planer, one head on rail, one on side.
- 36" x 36" x 10' Gray Planer, two heads.
- 3-36" x 36" x 8' Gray Planers, two heads.
- 36" x 36" x 8' Hamilton Planers, two heads.
- 30" x 30" x 10' Bement Planer, two heads.
- 1-No. 2 Kemp Smith New Universal Miller.
- 5-No. 0 Steptoe Hand Millers.
- 2-3" x 36" Jones & Lamson, geared head.
- 13" x 5' 6" New Carroll-Jamieson Quick-change Lathe.
- 14" x 6' New Carroll-Jamieson Quick-change Lathe.
- 15" x 6' New Sidney D.B.G. Quick-change Lathe, swing 17".
- 12-17" x 8' New National Quick-change Lathe.
- 3-17" x 8' New Sidney D.B.G. Quick-change Lathe, swing 19".
- 18" x 24" New Rahn Larmon Lathe, D.B.G., quick change.
- 9-19" x 8' New Sidney D.B.G. Quick-change Lathes, swings 21".
- 24" x 20' Reed Lathe.
- 32" x 24' Fay & Scott Lathe, raising blocks to swing 53".
- 5' Bickford Single Pulley Drive Radial.
- 4' Mueller Single Pulley Drive Radial.
- 2-20" Rockford High Duty Drills.
- 250-lb. New Little Giant Belt Hammer.
- 100-lb. New Little Giant Belt Hammer.
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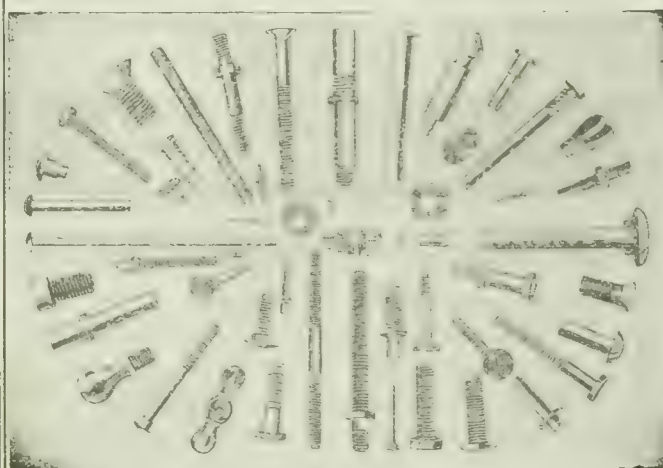
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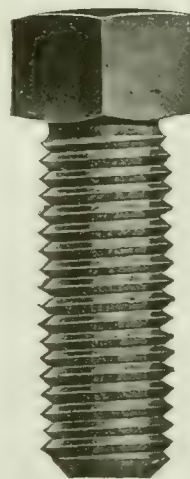
Our Mechanical Engineers are
at the service of our Clients.

United Brass & Lead, Limited

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When you want
Cap and Set
Screws and Semi-
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ed Hexagon Nuts
for your rush jobs
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us. Prompt ser-
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goods.

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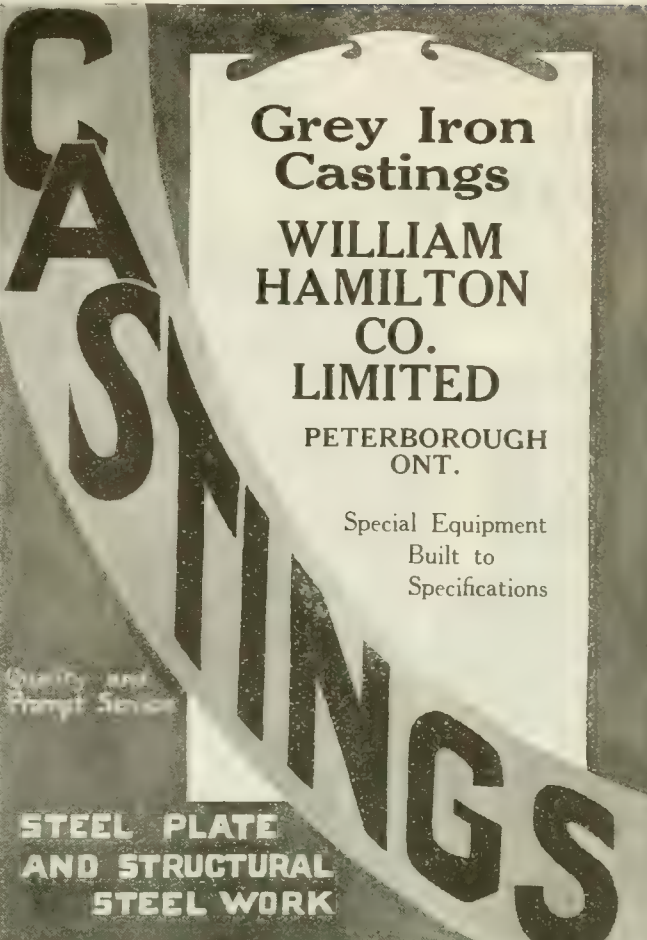
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Simple Automatic Laurie Corliss Engine.

Diameter of Cylinder 28"
Length of Stroke of Piston.. 48"
No. of Revolutions per minute 75
Fly Wheel 18' x 12½" Face
Weight 40,000 lbs.
Rated Horse Power 625
I. H. P. 700
Max. 950

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These engines are in excellent condition.
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Built to
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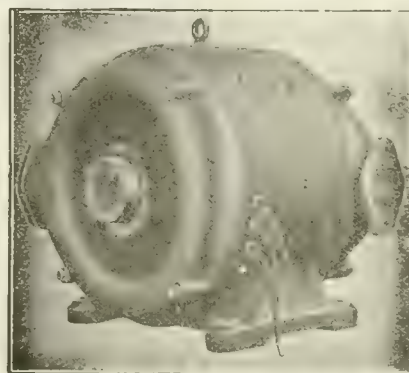
THE JOYCE-KOEBEL COMPANY, INC.
Formerly Geo. A. Joyce Co. Ltd.
NEW YORK LONDON

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49-63 Niagara Street, TORONTO

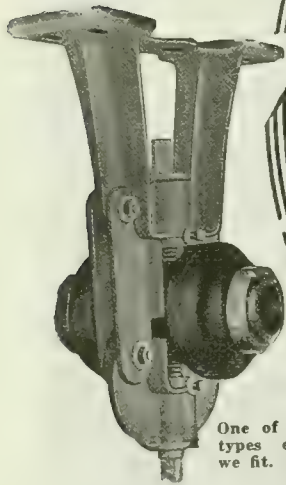
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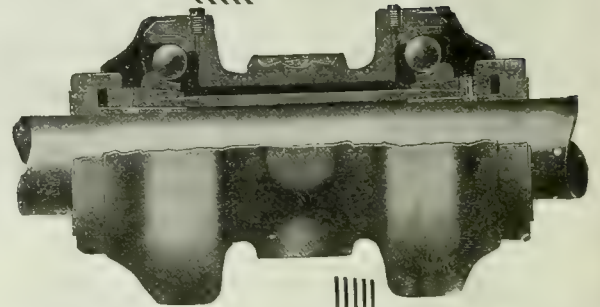
One of the many types of frames we fit.

Pay You to Adopt Them

Are you using babbitted bearings in your power transmission machinery? The power you are losing through friction by their use would in two years' time pay for an installation of Chapman type of Ball Bearings. This is a fact proven by their installation in over 3,000 plants in Canada and United States. Chapman Double Ball Bearings practically eliminate friction, and they require lubrication only once or twice a year—therein lies the secret of their economy.

Chapman Double Ball Bearing Company of Canada, Ltd.

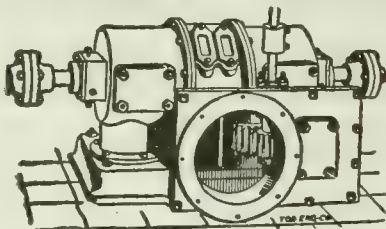
339-351 SORAUREN AVE., TORONTO
Room 408 Shaughnessy Bldg., Montreal; Trans-
mission Ball Bearing Co., Inc., 1050
Military Rd., Buffalo, N.Y.



Sectional view of Chapman Double row ball bearings.

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Over forty years' experience in designing and installing special turbines, both on vertical and horizontal shafts.

Can supply complete equipment, including flume, turbine and power transmission.

Stock of standard vertical shaft Little Giant Turbines on hand for prompt shipment.

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J. C. WILSON & CO.
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Thor

Portable Electric Drills

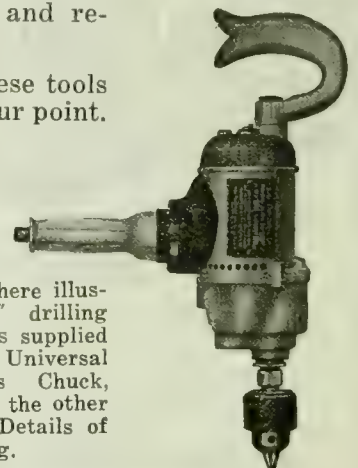
(Licensed under Burke Universal Motor Patent)

The various sizes in which these practical and durable tools are made, adapt them to all classes of mechanical assembling and repair work.

A feature of these tools is the famous four point.

"THOR" SWITCH

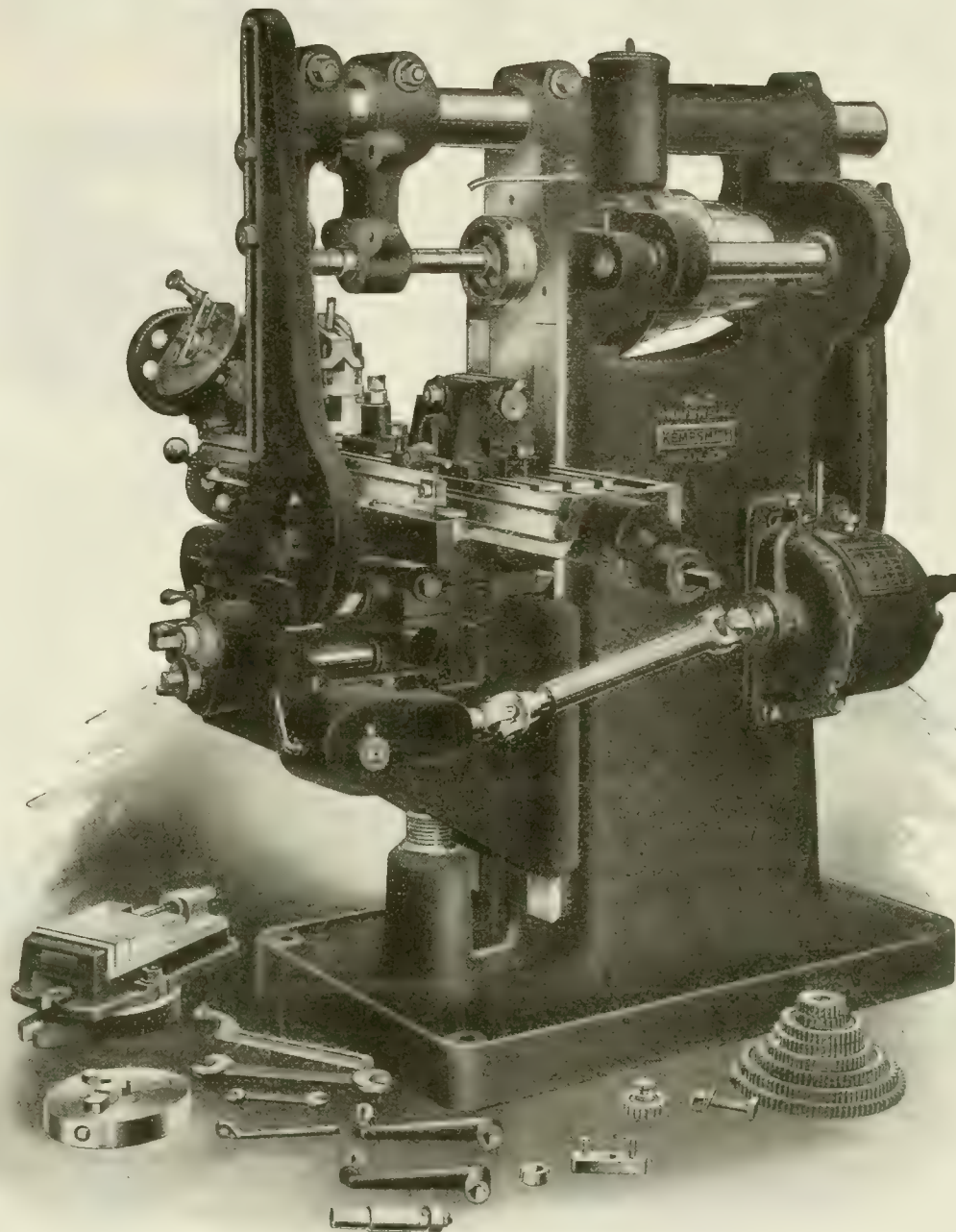
Our No. 00 Drill (here illustrated) has 5/16" drilling capacity in steel, is supplied with D. C. or Universal Motor, a Jacobs Chuck, aluminum case and the other "Thor" features. Details of full line in catalog.



Independent Pneumatic Tool Co.

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The Kemp Smith Miller enjoys a reputation for performance second to that of no other miller on the market. It is made in a long-established, well-organized and thoroughly modern plant devoted exclusively to the manufacture of Kemp Smith Millers and Attachments.

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H & G

Die Head Cuts Perfect Threads

The H. & G. Die Head illustrated is only 3 5/8" outside diameter, yet it will cut from the smallest up to 1" standard thread and up to 1 1/8" fine threads. For absolute proof of its ability to stand up and give good results, see the perfect threads it cuts on nickel steel. You can see these many places, but in

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Made in 9/16", 1", 1 1/2" and 2" sizes.

No stronger, more durable, more accurate Die Head was ever made.

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New Haven - Conn.

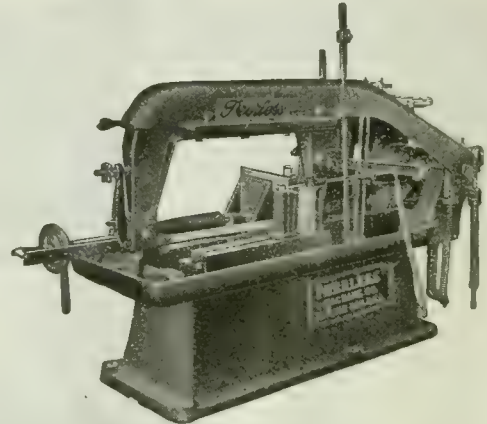
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THE NEW STANDARD

Increases Production 50 to 100%



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WHEN big plants of national reputation, who are using three, six, eight, twelve and up to thirty or more Peerless Machines say that they increase production from 50 to 100 per cent., saving in time, labor, blades and expensive material: AND WHEN we are willing to have you try out the Peerless for 30 days* at our own risk and expense, we paying freight both ways if it fails to make good:

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It actually controls by putting everybody in the plant on **schedule**.

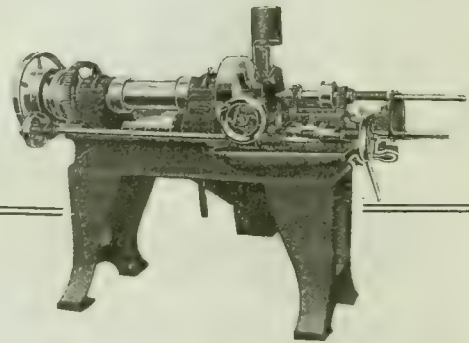
We are **practical men and experts** in this field.

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With a V-shaped cutter leading and a square-shaped cutter finishing off, one taking an up cut and the other a down cut, both at the same time, you can do double the amount of work with the HURLBUT-ROGERS CUTTING-OFF AND CENTERING MACHINE.

You get a square cut and save any sideway strain on machine or bearings. Investigate further.

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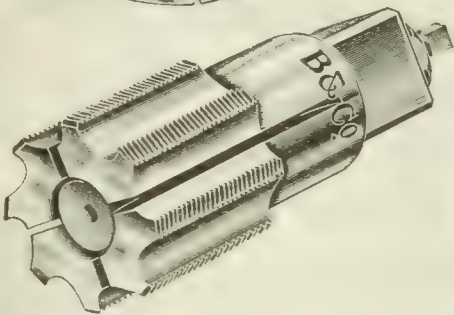
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Butterfield Tools reflect splendidly our 35 years' continuous concentration on improvement in high speed tools. You can't go wrong with a Butterfield.

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a drill
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a planer
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or any other machine shop equipment for which you really have no further use, why not turn it into cash?

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Hyde Engineering Works

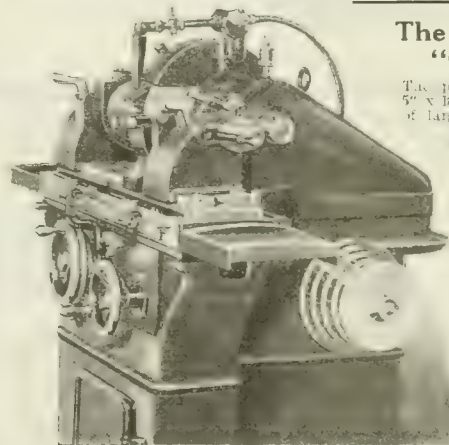
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Fifty-seven varieties of work men or less, from iron business to high-speed steel rollers, take their accurate finish from OTT Grinders and the natural machine in any plant—no matter what it makes—inevitably recommends others.

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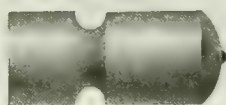
**OTT
Grinder Co.**
Indianapolis,
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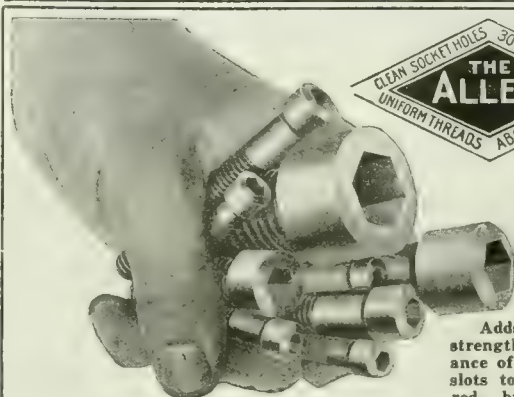
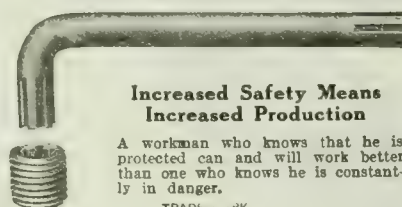
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Sheet Metal Working Machinery
THE D. H. STOLL CO., INC.
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strength and appear-
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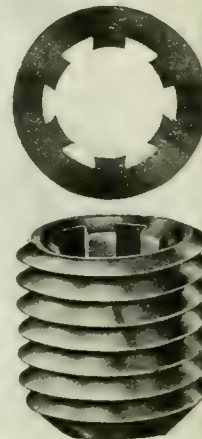
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Protect the workman. Free from the need
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over the safety of your men. And you will be
free from law suits, too.

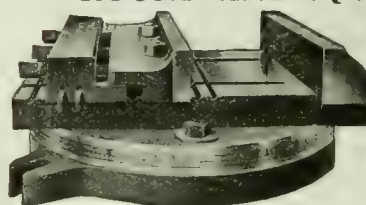
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Crank for Binders are
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Four cranks are set up on
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ARMCO IRON Rods are practically pure iron and are
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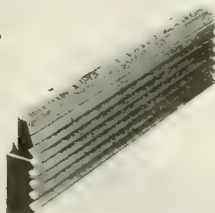
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Special facilities for Keyseating up to 6 in. diameter.

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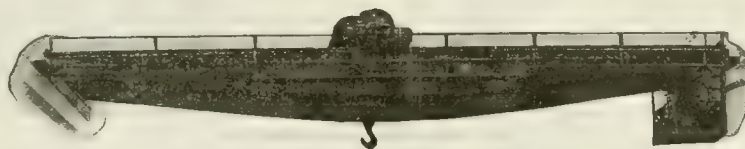
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Electric Cranes
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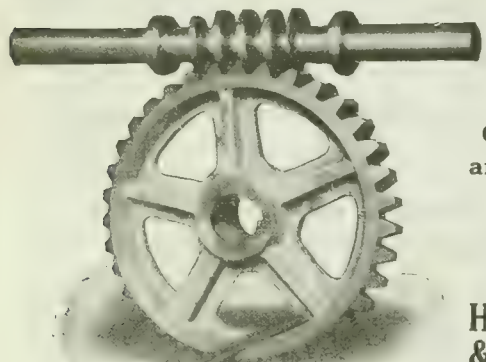
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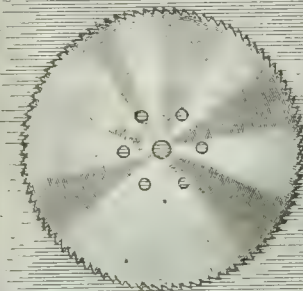


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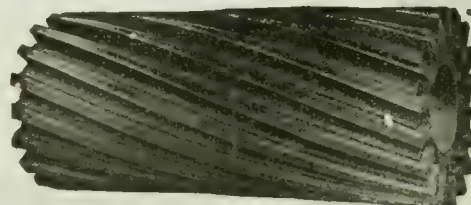
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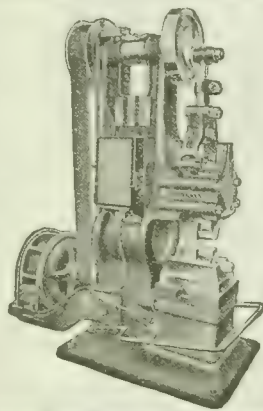


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For Service—Utility—Strength—Power
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Belt or Motor Drive

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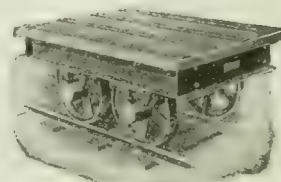
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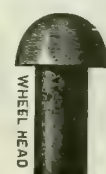
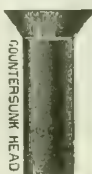
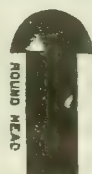
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STANDARD PRACTICE BULLETIN

Issued By

DIVISION OF STEEL SHIP CONSTRUCTION

UNITED STATES SHIPPING BOARD EMERGENCY FLEET CORPORATION

PUBLISHED BY THE SEPTEMBER 1918

AIR LINE SEPARATORS
FOR REMOVING WATER, SLACK
AND OTHER UNDESIRABLE
MATERIAL FROM COM-
PRESSION AIR DIS-
TILLING SYSTEMS

These separators are designed to remove water, oil, and other impurities from compressed air before it enters the distilling system. They are simple in construction and easy to operate. The separators are made of heavy steel and are capable of withstanding high pressures. They are available in various sizes to suit different requirements.

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Moisture and Oil Separator

Its efficiency lies in its simplicity and common sense principles.

Made in eight sizes for lines from 1" to 3" in diameter.



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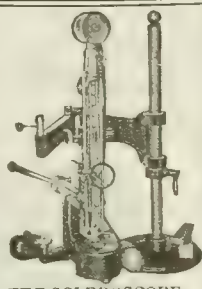
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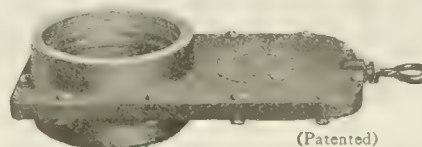
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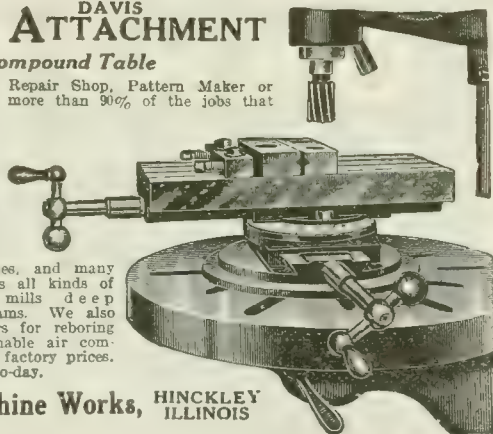
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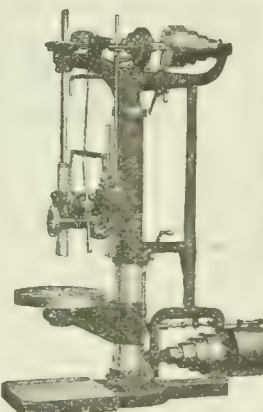
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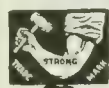
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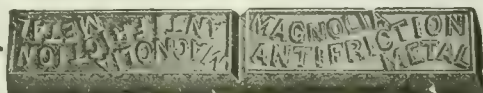
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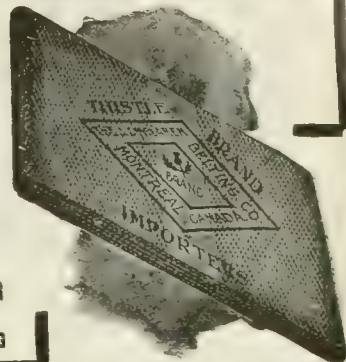
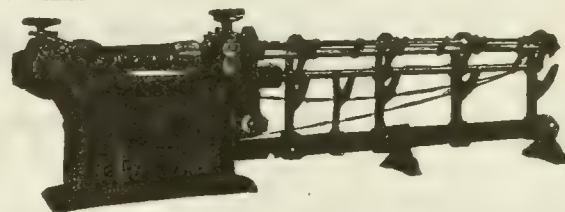
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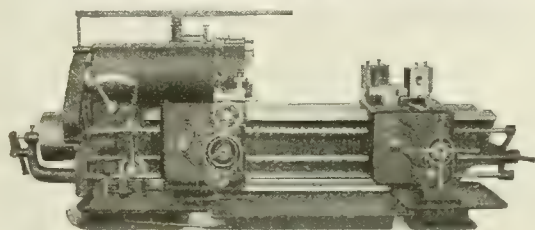
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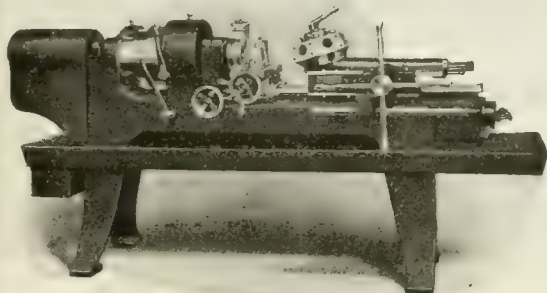
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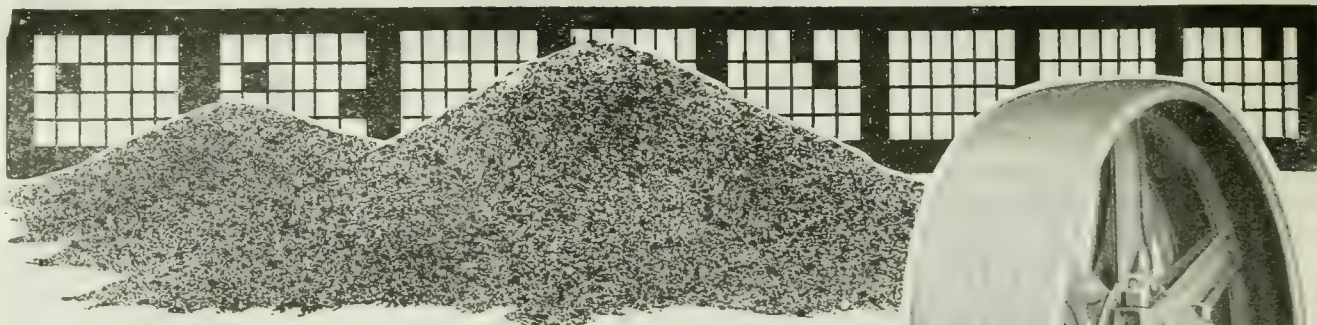
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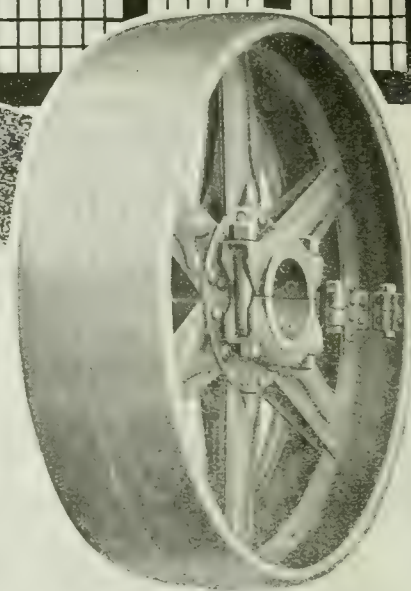
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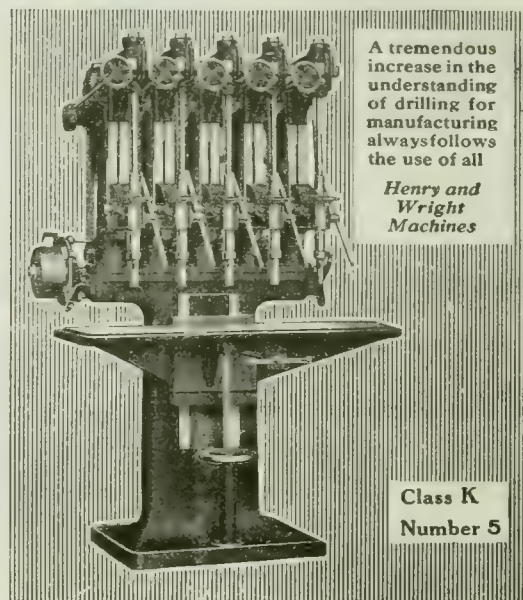


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Sheldons, Limited, Galt, Ont.
Whiting Foundry Equipment Co., Harvey, Ill.

CARS, STEEL BODY

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Winnipeg Iron Foundry Co., Winnipeg.
Wilson & Co., J. C., Belleville, Ont.

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Alexander Fleck, Ltd., Ottawa.
Greenleafs, Ltd., Belleville, Ont.
Oberdorfer Brass Co., M. L., Syracuse, N.Y.
St. Lawrence Welding Co., Montreal, Que.
Tallman Brass & Metal Co., Hamilton.
United Brass & Lead Ltd., Toronto.
Wentworth Mfg. Co., Hamilton, Ont.

CASTINGS, BRASS AND IRON

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Tolland Mfg. Co., Montreal, Que.

CASTINGS, GRAY IRON

Bernard Industrial Co., The A., Fortierville, Que.
Brown, Boggs & Co., Ltd., Hamilton, Can.
Alexander Fleck, Ltd., Ottawa.
Gardner & Son, Robt., Montreal.
Greenleafs, Ltd., Belleville, Ont.
Hull Iron & Steel Foundries, Ltd., Hull, Que.
International Malleable Iron Co., Guelph, Ont.
Kennedy & Sons, Ltd., Wm., Owen Sound.
Marsh Engineering Works, Belleville, Ont.
Plessisville Foundry Co., Plessisville, Que.
Sheldons, Limited, Galt, Ont.
Tolland Mfg. Co., Montreal, Que.
Fittings, Ltd., Oshawa, Ont.
Hamilton Co., Wm., Peterboro.
Wilson & Co., J. C., Belleville, Ont.

CASTINGS, ROUGH

Tolland Mfg. Co., Montreal, Que.

CASTINGS, NICHROME

Can. Driver-Harris Co., Harrison, N.J.

CASTINGS, STEEL CHROME AND**MANGANESE STEEL**

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Dominion Foundries & Steel, Ltd., Hamilton, Ont.
Hull Iron & Steel Foundries, Ltd., Hull, Que.
Kennedy & Sons, Ltd., Owen Sound.

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International Malleable Iron Co. Guelph, Ont.

CASTINGS, NICKEL STEEL

Hull Iron & Steel Foundries, Ltd., Hull, Que.

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Canadian Fairbanks-Morse Co., Ltd., Montreal.

Gardner, Robt., & Son, Montreal.

CEMENT HANDLING MACHINERY

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CENTERING MACHINES

Vicoria Foundry Co., Ottawa, Ont.

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Gardner, Robt., & Son, Montreal.
Hurlburt, Rogers Mach. Co., South Sudbury, Mass.
Niles-Bement-Pond Co., New York.
Pratt & Whitney Co., Dundas, Ont.
Wells Bros. Co. of Canada, Galt, Ont.

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Canadian Fairbanks-Morse Co., Ltd., Montreal.
Ford Chain Block & Mfg. Co., Philadelphia, Pa.
Garlock-Walker Machy. Co., Toronto, Ont.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Rice Lewis & Son Toronto, Ont.
Wright Mfg. Co., Lisbon, Ohio.

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Fittings, Ltd., Oshawa, Ont.

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Morse Chain Co., Ithaca, N.Y.

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Morse Chain Co., Ithaca, N.Y.

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Mechanics Tool Chest Co., Toronto.

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General Steel Co., Milwaukee, Wis.

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J. F. A. Comstedt, New York City, N.Y.
General Steel Co., Milwaukee, Wis.

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Garvin Machine Co., New York.

CHUCKS, COLLET, AIR

Smalley-General Co., Inc., Bay City, Mich.

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Canadian Fairbanks-Morse Co., Ltd., Montreal.
Cushman Chuck Co., Hartford, Conn.
Foss Mch. & Supply Co., The Geo. F., Montreal.
Gardner, Robt., & Son, Montreal.
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Gisholt Machine Co., Madison, Wis.
Hardinge Bros., Chicago, Ill.
Jacobs Mfg. Co., Hartford, Conn.
Ker & Goodwin, Bradford.
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Modern Tool Co., Erie, Pa.
Rice, Lewis & Son, Toronto, Ont.
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Whiton Machine Co., D. E., New London, Conn.

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Whitney Mfg. Co., Hartford, Conn.

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Wells Bros. Co. of Canada, Galt, Ont.

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CHUCKS, RING WHEEL

Ford-Smith Mach. Co., Hamilton, Ont.
Gardner Machine Co., Beloit, Wis.

CHUCKS, WRENCH

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Gisholt Machine Co., Madison, Wis.
New Britain Machine Co., New Britain, Conn.
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Niles-Bement-Pond Co., New York.
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Warner & Swasey Co., Cleveland, O.
Wood Turret Mach. Co., Brazil, Ind., U.S.A.

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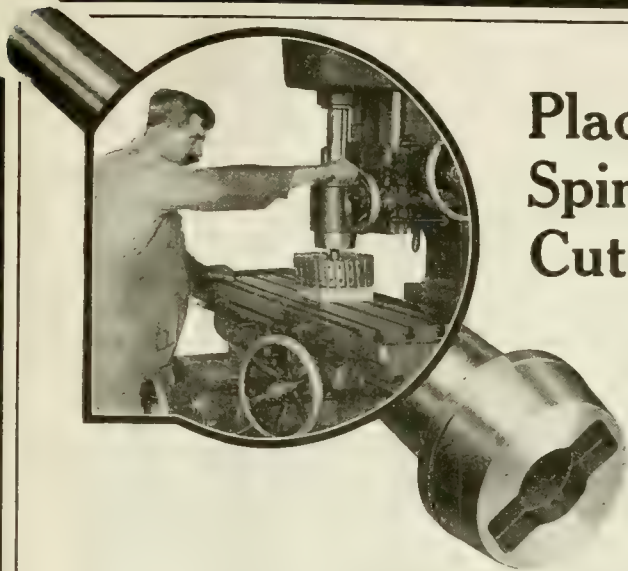
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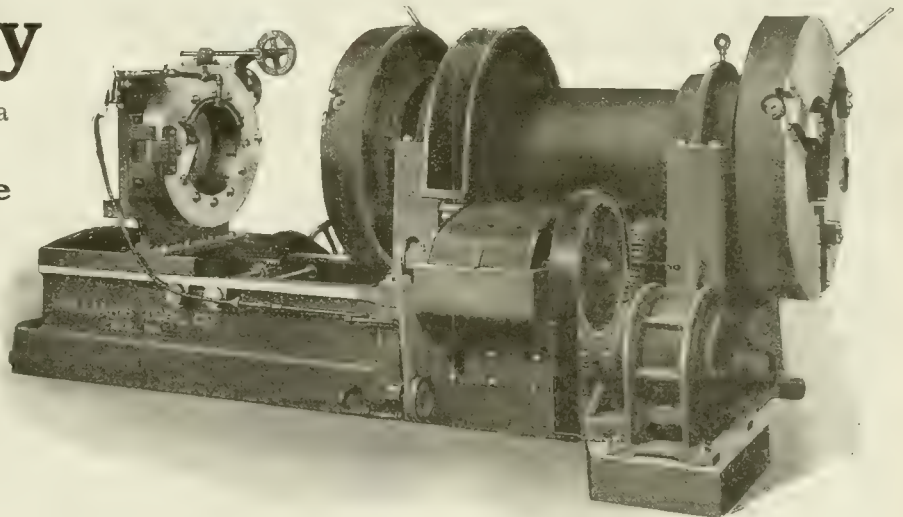
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Garvin Machine Co., New York.
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Wheel Truing Tool Co., Detroit.

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Niles-Bement-Pond Co., New York.
Pratt & Whitney Co., Dundas, Ont.
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Garlock-Walker Machinery Co., Toronto, Ont.
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Landis Tool Co., Waynesboro, Pa.
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Reed-Prentice Co., Worcester, Mass.
Niles-Bement-Pond Co., New York.
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A word about the contents—

"Why Laurier Will Wait"

In discussing the policy of the Liberal leader during the coming session of Parliament, J. K. Munro predicts, in January MACLEAN'S, that Laurier will allow Union Government a free hand. In this policy of inactivity "he sees the way open to the accomplishment of all his purposes. If he is half the politician his friends believe he is, he will sit and smile and wait—yet a little longer."

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 Bliss, E. W., Co., Brooklyn, N.Y.
 Brown, Boggs Co., Ltd., Hamilton, Canada.
 Canadian Billings & Spencer Ltd., Welland.
 Canada Machinery Corp., Galt, Ont.
 Erie Foundry Co., Erie, Pa.
 High Speed Hammer Co., Rochester, N.Y.
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 Plessisville Foundry Co., Plessisville, Que.
 Toledo Machine & Tool Co., Toledo.
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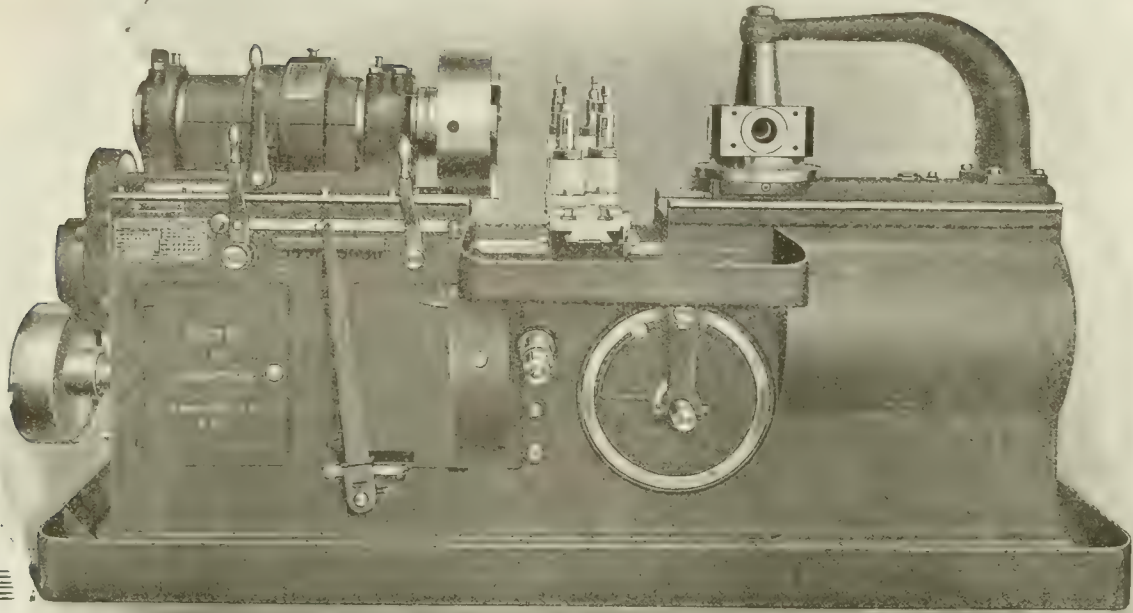
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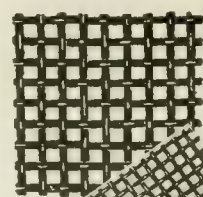
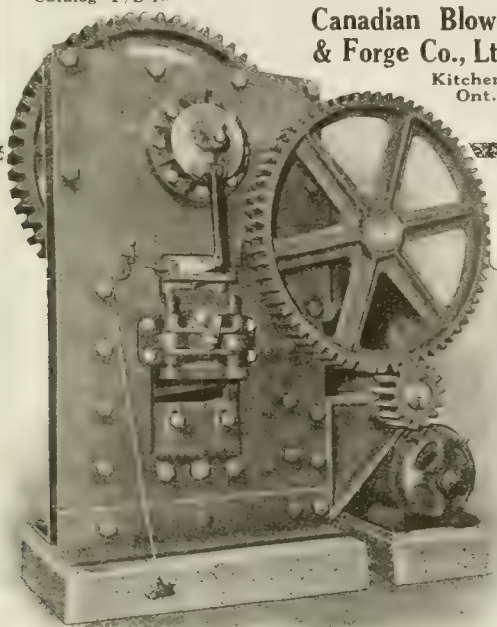
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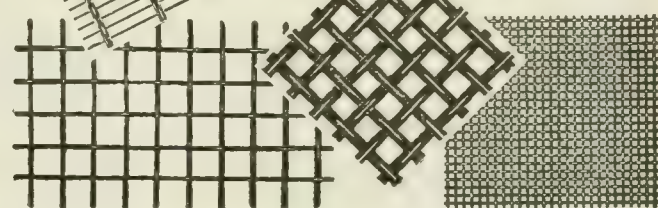
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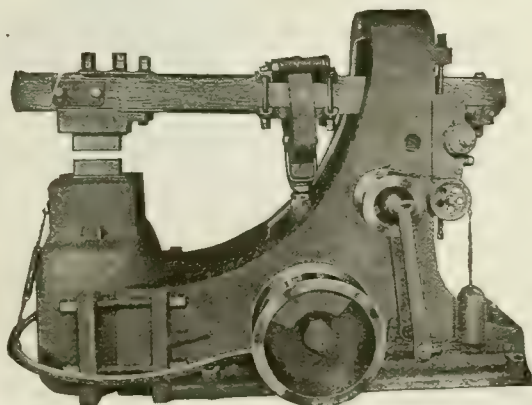
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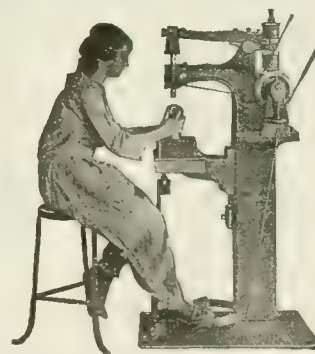
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 National Acme Co., Cleveland, Ohio.
 New Britain Machine Co., New Britain, Conn.
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 National Acme Co., Montreal, Que.
 Rice Lewis & Son, Toronto, Ont.
 Steel Co. of Canada, Ltd., Hamilton, Ont.
 United Brass & Lead Ltd., Toronto.
 Wilkinson & Kompas, Hamilton, Ont.

SCREW PLATES

Butterfield & Co., Rock Island, Que.
 A. B. Jardine & Co., Hespeler.
 Morse Twist Drill & Mch. Co., New Bedford, Mass.
 Rice Lewis & Son, Toronto, Ont.
 Taylor, J. A. M., 318 Stair Bldg., Toronto, Ont.
 Walls Bros. Co. of Canada, Galt, Ont.
 Wilkinson & Kompas, Hamilton, Ont.

SCREW SLOTS

Garvin Machine Co., New York.
 National Acme Co., Cleveland, Ohio.
 Pratt & Whitney Co., Dundas, Ont.

SECOND-HAND MACHINERY

The Geo. F. Ross Mch. & Supply Co., Montreal.
 Riverside Machinery Depot, Detroit, Mich.

SEPARATORS, SAND

Pangborn Corporation, Hagerstown, Md.

SET SCREWS, SAFETY

Aikenhead Hardware Co., Toronto, Ont.
 Allen Mfg. Co., Hartford, Conn.
 Bristol Co., Waterbury, Conn., U.S.A.
 Wilkinson & Kompas, Hamilton, Ont.

SHANKS, STRAIGHT AND TAPER

Jacobs Mfg. Co., Hartford, Conn.

SHAPERS

John Bertram & Sons Co., Dundas.
 Can. Fairbanks-Morse Co., Montreal.
 Canada Machinery Corp., Galt, Ont.
 The Geo. F. Ross Mch. & Supply Co., Montreal.
 Gardner, Robt., & Son, Montreal.
 Garlock-Walker Machinery Co., Toronto, Ont.
 Hendley Machine Co., Torrington, Conn.
 Hamilton Mach. Tool Co., Hamilton, Ohio.
 Rhodes Mfg. Co., Hartford, Conn.
 Steptoe Co., John, Cincinnati, Ohio.

SHAFTING

Algoma Steel Corp., Sault Ste. Marie, Ont.
 Can. Fairbanks-Morse Co., Montreal.
 Garlock-Walker Machy. Co., Ltd., Toronto, Ont.
 Jones & Glasco, Montreal.
 Niles-Bement-Pond Co., New York.
 Can. Drawn Steel Co., Hamilton, Ont.
 Pratt & Whitney Co., Dundas, Ont.
 Rice Lewis & Son, Toronto, Ont.
 A. R. Williams Machy. Co., Toronto.
 Wilkinson & Kompas, Hamilton, Ont.
 Wilson & Co., J. C., Belleville, Ont.

SHARPENING STONES

Norton Co., Worcester, Mass.
 Rice, Lewis & Son, Toronto, Ont.

SHEARING MACHINES, ANGLE IRON, BAR AND GATE

John Bertram & Sons Co., Dundas.
 Bertrams, Ltd., Edinburgh, Scotland.
 Canada Machinery Corp., Galt, Ont.
 Garlock-Walker Machinery Co., Toronto, Ont.
 A. B. Jardine & Co., Hespeler, Ont.
 Niles-Bement-Pond Co., New York.
 Toledo Machine & Tool Co., Toledo.

SHEARS, POWER

John Bertram & Sons Co., Dundas.
 Blais, E. W. Co., Brooklyn, N.Y.
 Brown, Boggs & Co., Ltd., Hamilton, Canada.
 Can. Blower & Forge Co., Kitchener, Ont.
 Canada Machinery Corp., Galt, Ont.
 Ferracute Machine Co., Bridgeton, N.J.
 Garlock-Walker Machinery Co., Toronto, Ont.
 Wickes & Co., Saginaw, Mich.
 A. B. Jardine & Co., Limited, Hespeler, Ont.
 National Machy. Co., Tiffin, Ohio.
 Niles-Bement-Pond Co., New York.
 Stoll Co., Inc., D. H., Buffalo, N.Y.
 Toledo Machine & Tool Co., Toledo.

SHEARS, PNEUMATIC

Toledo Machine & Tool Co., Toledo, Ohio.

SHEARS, SQUARING

Brown, Boggs & Co., Hamilton, Canada.
 Stoll Co., D. H., Buffalo, N.Y.

SHEET METAL WORKING TOOLS

Baird Machine Co., Bridgeport, Conn.
 Blais, E. W. Co., Brooklyn, N.Y.
 Brown, Boggs & Co., Hamilton, Canada.
 Peck, Stow & Wilcox, Southington, Conn.
 Stoll Co., D. H., Buffalo, N.Y.

SHEET METAL STAMPINGS

Dominion Forge & Stpg. Co., Walkerville, Ont.

SHEET BANDING MACHINES, HYDRAULIC

Garlock-Walker Machy. Co., Ltd., Toronto, Ont.
 Metalwood Mfg. Co., Detroit, Mich.
 Perrin, Ltd., W. R., Toronto, Ont.
 West Tire Setter Co., Rochester, N.Y.

SHEET METAL WORKING MACHINERY

Stoll Co., Inc., D. H., Buffalo, N.Y.

SHELVING, STEEL

Dennis Wire & Iron Works, London, Ontario.

SHELL PAINTING MACHINES

Can. Blower & Forge Co., Kitchener, Ont.
 Sheldons, Ltd., Galt, Ont.

SHELL RIVETERS

Grant Mfg. & Machine Co., Bridgeport, Conn.
 High Speed Hammer Co., Rochester, N.Y.

SHOP FURNITURE

Dennis Wire & Iron Works, London, Ontario.
 New Britain Mach. Co., New Britain, Conn.

SIDE TOOLS

Armstrong Bros. Tool Co., Chicago.
 Can. B. K. Morton, Toronto, Montreal.
 Williams & Co., J. H., Brooklyn, N.Y.

SILENT CHAINS

Can. Link-Belt Co., Toronto, Ont.
 Jones & Glasco, Montreal.

SLIDGES

Aikenhead Hardware Co., Toronto, Ont.
 Rice, Lewis & Son, Toronto, Ont.
 Whitman & Barnes Mfg. Co., St. Catharines, Ont.
 Wilkinson & Kompas, Hamilton, Ont.

SLINGS, CHAIN

Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

SLOTTERS

Betts Machine Co., Rochester, N.Y.
 Garvin Machine Co., New York.
 National Acme Co., Cleveland, Ohio.
 Niles-Bement-Pond Co., New York.
 Rhodes Mfg. Co., Hartford, Conn.

SMOKESTACKS

Canadian Welding Works, Montreal, Que.
 MacKinnon Steel Co., Sherbrooke, Quebec.
 Marsh Engineering Works, Belleville, Ont.

SOCKETS

Brown & Sharpe Mfg. Co., Providence.
 Cleveland Twist Drill Co., Cleveland.
 Keystone Mfg. Co., Buffalo, N.Y.
 Modern Tool Co., Erie, Pa.
 Morse Twist Drill & Mch. Co., New Bedford, Mass.
 Rice, Lewis & Son, Toronto, Ont.

SOCKET HEAD CAP SCREWS

Allen Mfg. Co., Hartford, Conn.

SOLDERING IRONS

Aikenhead Hardware Co., Toronto, Ont.
 Brown, Boggs & Co., Hamilton, Canada.
 Prest-O-Lite Co., Inc., Toronto, Ont.
 Rice, Lewis & Son, Toronto, Ont.
 United Brass & Lead Ltd., Toronto.

SOLDER

Aikenhead Hardware Co., Toronto, Ont.
 Rice, Lewis & Son, Toronto, Ont.
 Tallman Brass & Metal Co., Hamilton.
 United Brass & Lead, Ltd., Toronto.

SPEED REDUCING GEARS

Can. Link-Belt Co., Toronto, Ont.
 Jones & Glasco, Montreal.

SPRINGS, MACHINERY

Barnes, Wallace Co., Bristol, Conn.
 Can. Steel Foundries, Ltd., Montreal, Que.
 Cleveland Wire Spring Co., Cleveland.
 Garlock-Walker Machinery Co., Toronto, Ont.
 Jas. Steele, Ltd., Guelph, Ont.

SPECIAL MACHINERY

Baird Machine Co., Bridgeport, Conn.
 Banfield W. H. & Sons, Toronto.
 Beaver Engineering Co., Montreal, Que.
 Bertram, John, & Sons Co., Dundas.
 Blais, E. W. Co., Brooklyn, N.Y.
 Brown, Boggs & Co., Hamilton, Canada.
 Brown Engineering Corp., Toronto, Ont.
 Elliott & Whitehall Mach. & Tool Co., Galt, Ont.
 Ferracute Mach. Co., Bridgeton, N.J.
 Ford-Smith Machine Co., Hamilton, Ont.
 Garlock-Walker Machinery Co., Toronto, Ont.
 Garvin Machine Co., New York.
 Goeley & Edmund, Inc., Cranford, N.Y.
 John H. Hall & Sons, Bradford.
 Hydraulic Machy. Co., Ltd., Montreal, Que.
 A. B. Jardine & Co., Hespeler, Ont.
 National Acme Co., Cleveland, Ohio.
 Mulliner & Enlund Tool Co., Syracuse, N.Y.
 Marten Machine Co., Hamilton, Ont.
 Reed-Prentice Co., Worcester, Mass.
 Sleeper & Hartley, Inc., Worcester, Mass.
 Stoll Co., D. H., Buffalo, N.Y.
 Victoria Foundry Co., Ottawa, Ont.
 Welland Motor & Machine Co., Welland, Ont.
 Wilson & Co., J. C., Belleville, Ont.
 William R. Perrin, Ltd., Toronto.
 Windsor Mach. & Tool Co., Windsor, Ont.

SPRING COILING AND WINDING MACHINERY

Baird Machine Co., Bridgeport, Conn.
 Garvin Machine Co., New York.
 Sleeper & Hartley, Inc., Worcester, Mass.

SPRING MAKING MACHINERY (AUTOMATIC)

Baird Machine Co., Bridgeport, Conn.
 Sleeper & Hartley, Inc., Worcester, Mass.

SPROCKETS, CHAIN

Can. Link-Belt Co., Toronto, Ont.
 Grant Gear Works, Boston, Mass.
 Jones & Glasco, Montreal.
 Morse Chain Co., Itasca, N.Y.
 Philadelphia Gear Works, Philadelphia, Pa.
 Wilson & Co., J. C., Belleville, Ont.

SPROCKET WHEELS, CAST

Can. Link-Belt Co., Toronto, Ont.
 Perrin, Wm. R., Toronto.
 Wilson & Co., J. C., Belleville, Ont.

STAIRS, IRON

Can. Welding Works, Montreal, Que.
 Canada Wire & Iron Goods Co., Hamilton, Ont.

STAMPINGS, SHEET BRASS, COPPER,**ALUMINUM AND STEEL**

Dona. Forge & Stamping Co., Walkerville, Ont.
 Homer & Wilson, Hamilton, Ont.
 Wentworth Mfg. Co., Hamilton, Ont.

STAMPING MACHINERY

Bliss Co., E. W., Brooklyn, N.Y.
 Brown, Boggs & Co., Hamilton, Canada.
 Canada Machinery Corp., Galt, Ont.
 Ferracute Mach. Co., Bridgeton, N.J.

STAMPS, STEEL ALPHABET, FIGURES

Matthews, Jas. H. & Co., Hartford, Conn.
 Pritchard-Andrews Co., Ottawa, Can.

STAPLE MACHINES

Sleeper & Hartley, Inc., Worcester, Mass.

STEAM SEPARATORS AND TRAPS

Can. Fairbanks-Morse Co., Montreal.
 Sheldons, Ltd., Galt, Ont.

STEEL, CRUCIBLE TOOL

Hammond Steel Co., Inc., Syracuse, N.Y.
 Illingworth Steel Co., John, New York, N.Y.
 Vulcan Crucible Steel Co., Aliquippa, Pa.

STEEL, CARBON, FERRO-TUNGSTEN

Armstrong, Whitworth of Canada, Montreal, Que.
 Baker & Co., Inc., H., Montreal, Que.
 Can. B. K. Morton, Toronto, Montreal.
 Firth & Sons, Thos., Montreal, Que.
 Latrobe Electric Steel Co., Latrobe, Pa.
 Vanadium-Alloy Steel Co., Pittsburgh, Pa.
 Vulcan Crucible Steel Co., Aliquippa, Pa.

STEEL CASTINGS

Joliette Steel Co., Montreal, Que.
 Kennedy & Sons, Wm. Owen Sound, Ont.
 Can. Brakeshoe Co., Sherbrooke, Que.
 Nova Scotia Steel & Coal Co., New Glasgow, N.S.
 Swedish Crucible Steel Co., Windsor, Ont.

STEEL, COLD ROLLED

Can. Drawn Steel Co., Hamilton, Ont.
 Rice Lewis & Son, Toronto, Ont.
 Swedish Steel & Importing Co., Ltd., Montreal.
 Union Drawn Steel Co., Hamilton, Ont.

STEEL PRESSURE BLOWERS

Can. Blower & Forge Co., Kitchener, Ont.
 Can. Fairbanks-Morse Co., Montreal.
 Sheldons, Ltd., Galt, Ont.

STEEL, NICKEL

Firth & Sons, Thos., Montreal, Que.
 Vulcan Crucible Steel Co., Aliquippa, Pa.

STEEL, HIGH SPEED

Armstrong Whitworth of Canada, Ltd., Montreal.
 Atkins & Co., Wm., Sheffield, Eng.
 Baker & Co., Inc., H., Montreal, Que.
 Can. Fairbanks-Morse Co., Montreal.
 Can. B. K. Morton, Toronto, Montreal.
 H. A. Drury Co., Ltd., Montreal.
 Marshall & Co., Geo., Toronto, Ont.
 Firth & Sons, Thos., Montreal, Que.
 Hawkrige Bros. Co., Boston, Mass.
 Illingworth Steel Co., John, New York, N.Y.
 Latrobe Electric Steel Co., Latrobe, Pa.
 Plewes, Ltd., Winnipeg, Man.
 Rice Lewis & Son, Toronto, Ont.
 Standard Alloy Company, Pittsburgh, Pa.
 Swedish Steel & Importing Co., Ltd., Montreal.
 Vanadium-Alloy Steel Co., Pittsburgh, Pa.
 Vulcan Crucible Steel Co., Aliquippa, Pa.; represented in Canada by Norton, Callard & Co., Montreal, Que.

STEEL, GRIT

Pittsburgh Crushed Steel Co., Pittsburgh, Pa.

STEEL, CHROME AND MANGANESE

Joliette Steel Co., Montreal, Que.

STEEL, OPEN HEARTH

Illingworth Steel Co., John, New York, N.Y.

STEEL, CRUSHED

Pittsburgh Crushed Steel Co., Pittsburgh, Pa.

STEEL, ROCK DRILL

Armstrong, Whitworth of Canada, Montreal, Que.

STEEL, SPECIAL ELECTRIC ALLOY

Hammond Steel Co., Inc., Syracuse, N.Y.

STELLITE, HIGH-SPEED TOOL METAL

Deloro Smelting & Refining Co., Toronto, Ont.

STEEL, STRUCTURAL

Algoma Steel Corp., Sault Ste. Marie, Ont.

STEEL, VANADIUM

Armstrong, Whitworth of Canada, Montreal, Que.
 Drury, H. A., Co., Montreal, Que.
 Standard Alloy Co., Pittsburgh, Pa.
 Vanadium-Alloy Steel Co., Pittsburgh, Pa.
 Vulcan Crucible Steel Co., Aliquippa, Pa.

STOCK RACKS FOR BARS, PIPING, ETC.

Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
 New Britain Machine Co., New Britain, Conn.

STOCKS, PIPE

Butterfield & Co., Rock Island, Que.
 A. B. Jardine & Co., Limited, Hespeler, Ont.
 Rice, Lewis & Son, Toronto, Ont.
 Walls Bros. Co. of Canada, Galt, Ont.

STOOLS, STEEL, SHOP

New Britain Machine Co., New Britain, Conn.

STRAIGHTENING MACHINERY

Baird Machinery Co., Bridgeport, Conn.
 Bertrams, Ltd., Edinburgh, Scotland.

STRAND

Page Steel & Wire Co., Adrian, Mich.

SWITCHES, RAILWAY

Can. Steel Foundries, Ltd., Montreal.

TABLES, SAND-BLAST

Pangborn Corporation, Hagerstown, Md.

TACK (DOUBLE POINT) MACHINES

Sleeper & Hartley, Inc., Worcester, Mass.

TAPPING MACHINES (PNEUMATIC)

Cleveland Pneumatic Tool Co. of Can., Toronto, Ont.



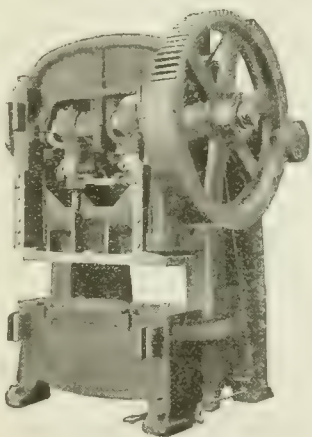
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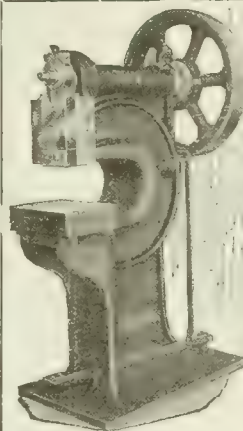
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For reaching into the center of large sheets of metal, this model of the "Stiles" type of Press is provided. The massiveness of the frame and its special design make it rigid, even under the most severe punching strains.



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Bilton Mach. Tool Co., Bridgeport, Conn.
Bettis Machine Co., Rochester, N.Y.

MILLING CUTTERS

Cleveland Milling Machine Co., Cleveland, O.

MILLING MACHINES, THREAD

Gisholt Machine Co., Madison, Wis.
Hardinge Bros., Inc., Chicago, Ill.
United States Mach. Tool Co., Cincinnati, Ohio.
Pratt & Whitney Co., Dundas, Ont.
Stephens Co., The John Co., Cincinnati, Ohio.
W. T. Whitehead, Son, & Co., Montreal, Que.

MILLING MACHINES, HORIZONTAL AND VERTICAL

Bocker Milling Machine Co., Boston, Mass.
Brown & Sharpe Mfg. Co., Providence.
Bertram, John, & Sons Co., Dundas, Ont.
Canada Machinery Corp., Galt, Ont.
Ford-Smith Mach. Co., Hamilton, Ont.
The Geo. F. Foss Mch. & Supply Co., Montreal.
Fox Machine Co., Jackson, Mich.
Garlock-Walker Machinery Co., Toronto, Ont.
Gooley & Edlund, Cortland, N.Y.
Hardinge Bros., Inc., Chicago, Ill.
Kemp Smith Mfg. Co., Milwaukee, Wis.
R. K. LeBlond Mach. Tool Co., Cincinnati, Ohio.
Niles-Bement-Pond Co., New York.
Pratt & Whitney Co., Dundas, Ont.
Riverside Machinery Depot, Detroit, Mich.
Stephens, The John Co., Cincinnati, Ohio.
United States Mach. Tool Co., Cincinnati, Ohio.
Whitney Mfg. Co., Hartford, Conn.
A. R. Williams Machy. Co., Toronto.

MILLING MACHINES, PLAIN, PENCH AND UNIVERSAL

Becker Milling Machine Co., Boston, Mass.
Bilton Mach. Tool Co., Bridgeport, Conn.
Brown & Sharpe Mfg. Co., Providence.
Canada Machinery Corp., Galt, Ont.
Cincinnati Milling Machine Co., Cincinnati.
Ford-Smith Mach. Co., Hamilton, Ont.
Foss, The Geo. F., Mch. & Supply Co., Montreal.
Fox Machine Co., Jackson, Mich.
Garlock-Walker Machinery Co., Toronto, Ont.
Garvin Machine Co., New York.
Gooley & Edlund, Inc., Cortland, N.Y.
Hardinge Bros., Inc., Chicago, Ill.
Hendey Machine Co., Torrington, Conn.
Kemp Smith Mfg. Co., Milwaukee, Wis.
R. K. LeBlond Mach. Tool Co., Cincinnati, Ohio.
Niles-Bement-Pond Co., New York.
Pratt & Whitney Co., Dundas, Ont.
Stephens, The John Co., Cincinnati, Ohio.

MILLING MACHINES, PROFILE

Brown & Sharpe Mfg. Co., Providence.
Can. Fairbanks-Morse Co., Montreal.
Foss, The Geo. F., Mch. & Supply Co., Montreal.
Garlock-Walker Machinery Co., Toronto, Ont.
Garvin Machine Co., New York.
Pratt & Whitney Co., Dundas, Ont.
Riverside Machinery Depot, Detroit, Mich.

MILLING TOOLS

Aikenhead Hardware Co., Toronto, Ont.
Brown & Sharpe Mfg. Co., Providence, R.I.
Ford-Smith Mach. Co., Hamilton, Ont.
Geometric Tool Co., New Haven, Conn.
Kemp Smith Mfg. Co., Milwaukee, Wis.
Rice Lewis & Son, Toronto, Ont.
Tabor Mfg. Co., Philadelphia, Pa.

MINE CARS

Can. Fairbanks-Morse Co., Montreal.
Dominion Bridge Co., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.
Marsh Engineering Works, Belleville, Ont.
Modern Tool Co., Erie, Pa.
Pratt & Whitney Co., Dundas, Ont.
Sheldons, Ltd., Galt, Ont.

MINING MACHINERY

Can. Fairbanks-Morse Co., Montreal.
Marsh Engineering Works, Belleville, Ont.
A. R. Williams Machy. Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

MIXERS, SAND

Frost Mfg. Co., Chicago, Ill.

MODEL WORK

Windsor Mach. & Tool Co., Windsor, Ont.

MORTISING MACHINES

Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machinery Co., Toronto, Ont.
New Britain Mach. Co., New Britain, Conn.

MOTORS, ELECTRIC

Can. Fairbanks-Morse Co., Montreal.
Garlock-Walker Machinery Co., Toronto, Ont.
Lancashire Dynamo & Motor Co., Ltd., Toronto.
MacGovern & Co., Montreal, Que.
A. R. Williams Machy. Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

MOTORS, PNEUMATIC

Cleveland Pneumatic Tool Co. of Canada, Toronto.
Garlock-Walker Machinery Co., Toronto, Ont.

MULTIPLE INDEX CENTRES

Garvin Machine Co., New York.

MUNTZ METAL

Brown Copper & Brass Roller Mills, New Toronto, Ont.

NAILS

Page Steel & Wire Co., Adrian, Mich.

NAIL MACHINERY

Sieper & Hartley, Inc., Worcester, Mass.

NAME PLATES, BRONZE, ETCHED AND STAMPED

Matthews, Jas. H., & Co., Pittsburgh, Pa.
Pritchard-Andrews Co., Ottawa, Ont.

NICKEL

Boker & Co., Inc., H., Montreal, Que.

NICKEL SILVER

Brown's Copper & Brass Rolling Mills, New Toronto, Ont.

NICKEL STEEL

J. F. A. Comstedt, New York City, N.Y.

NIPPLE HOLDERS

Curtis & Curtis Co., Bridgeport, Conn.

NIPPLE THREADING MACHINES

John H. Hall & Sons, Ltd., Brantford, Ont.
Landis Machine Co., Waynesboro, Pa.

NITROGEN

Carter Welding Co., Toronto, Ont.

NUTS

Williams & Co., J. H., Brooklyn, N.Y.

NUTS, SEMI-FINISH AND FINISHED

Galt Machine Screw Co., Galt, Ont.
National-Acme Co., Cleveland, Ohio.
United Brass & Lead Ltd., Toronto.
Wilkinson & Kompass, Hamilton, Ont.

NUT Burring MACHINES

National Machy. Co., Tiffin, Ohio.

NUT MACHINES (HOT)

National Machy. Co., Tiffin, Ohio.

NUT FACING AND BOLT SHAVING MACHINES

Garvin Machine Co., New York.
National Machinery Co., Tiffin, Ohio.
Victor Tool Co., Waynesboro, Pa.

NUT TAPPERS

Bertram, John & Sons Co., Dundas Ont.
Canada Machinery Corp., Galt, Ont.
Garvin Machine Co., New York.
Greenfield Tap & Die Corp., Greenfield, Mass.
Hall, J. H., & Son, Brantford, Ont.
A. B. Jardine & Co., Hespeler.
Landis Machine Co., Waynesboro, Pa.
National Machinery Co., Tiffin, Ohio.

OILS, MOTOR

Elm Cutting Oil Co., Toronto, Ont.

OILS, DRAWING

Elm Cutting Oil Co., Toronto, Ont.

OIL SEPARATORS

Can. Fairbanks-Morse Co., Montreal.
Sheldons, Ltd., Galt, Ont.
Smart-Turner Machine Co., The, Hamilton.

OIL STONES

Aikenhead Hardware Co., Toronto, Ont.
Carborundum Co., Niagara Falls, N.Y.
Norton Co., Worcester, Mass.
Rice Lewis & Son, Toronto, Ont.

OIL STORAGE SYSTEMS

Bowser & Co., Inc., S. F., Toronto, Ont.

OPTICAL SUPPLIES

Consolidated Optical Co., Toronto, Ont.

OSCILLATING VALVE GRINDERS (PNEUMATIC)

Cleveland Pneumatic Tool Co. of Can., Toronto.

OVENS FOR BAKING, BLUING, DRYING, ENAMELING, JAPANNING AND LACQUERING

Brantford Oven & Rack Co., Brantford, Ont.
Whiting Foundry Equipment Co., Harvey, Ill.

OVEN TRUCKS, STEEL

Brantford Oven & Rack Co., Brantford, Ont.
MacKinnon Steel Co., Sherbrooke, Que.
Whiting Foundry Equipment Co., Harvey, Ill.

OVENS FOR DRYING, TEMPER AND UNDER TRUCKS

Brantford Oven & Rack Co., Brantford, Ont.

OXY-ACETYLENE WELDING AND CUTTING

Can. Welding Works, Montreal, Que.
Carter Welding Co., Toronto, Ont.
Prest-O-Lite Co., Inc., Toronto, Ont.
St. Lawrence Welding Co., Montreal, Que.

OXY-ACETYLENE WELDING AND CUTTING PLANT

Carter Welding Co., Toronto, Ont.
Prest-O-Lite Co., Inc., Toronto, Ont.
Oxyweld Co., Ltd., Toronto, Ont.

OXYGEN (SEE ACETYLENE)

Canadian Welding Works, Montreal, Que.

PACKINGS, ASBESTOS

Canadian Welding Works, Montreal, Que.
Cleveland Wire Spring Co., Cleveland.
New Britain Mach. Co., New Britain, Conn.

PACKINGS, LEATHER, HYDRAULICS, ETC.

Baxter & Co., Ltd., J. R., Montreal, Que.
Graton & Knight Mfg. Co., Worcester, Mass.
Gutta Percha & Rubber, Ltd., Toronto, Can.
William R. Perrin, Ltd., Toronto.

PANS, WET AND DRY

Frost Mfg. Co., Chicago, Ill.

PAPER MILL CONVEYORS AND DRIVES

Can. Link-Belt Co., Toronto, Ont.

PAPER MILL MACHINERY

Bertrams, Ltd., Edinburgh, Scotland.
Hydraulic Machy. Co., Ltd., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.

PATTERN SHOP EQUIPMENT

Canada Machinery Corp., Galt, Ont.
Fox Machine Co., Jackson, Mich.
Garlock-Walker Machinery Co., Toronto, Ont.

PATENT SOLICITORS

Budden, Hanbury A., Montreal.
Fetherstonhaugh & Co., Ottawa.
Marion & Marion, Montreal.
Ridout & Maybee, Toronto.
Dominion Pattern Works, Toronto, Ont.
J. C. Wilson & Co., Belleville, Ont.
Greenleaf Ltd., Belleville, Ont.
Marten Machine Co., Hamilton, Ont.

PECK CARRIERS FOR POWER PLANTS

Can. Link-Belt Co., Toronto, Ont.

PERFORATED METALS AND ORNAMENTAL IRON GOODS

Canada Wire & Iron Goods Co., Hamilton.

PIG IRON

Hanna & Co., M. A., Cleveland, O.
Steel Co. of Canada, Ltd., Hamilton, Ont.

PIPE FITTINGS, MALLEABLE AND CAST IRON

International Malleable Iron Co., Guelph, Ont.

PIPE CUTTING AND THREADING MACHINES

Butterfield & Co., Rock Island, Que.
Can. Fairbanks-Morse Co., Montreal.
Curtis & Curtis Co., Bridgeport, Conn.
Fox Machine Co., Jackson, Mich.
Garlock-Walker Machinery Co., Toronto, Ont.
Garvin Machine Co., New York.
John H. Hall & Sons, Brantford.
A. B. Jardine & Co., Hespeler, Ont.
Landis Machine Co., Waynesboro, Pa.
R. McDougall Co., Galt.
Wells Bros. Co. of Canada, Galt, Ont.
Williams Tool Co., Erie, Pa.
A. R. Williams Machy. Co., Toronto.

PHOTOSTATS

Commercial Camera Co., Providence, R.I.

PIPE RIVETED STEEL

Toronto Iron Works, Ltd., Toronto.

PIPE CUTTERS, ROLLING

Curtis & Curtis Co., Bridgeport, Conn.
John H. Hall & Sons, Ltd., Brantford, Ont.
Wells Bros. Co. of Canada, Galt, Ont.

PISTON AND PISTON RING MACHINES

National Acme Co., Windsor, Vt.

PLANER JACKS

Armstrong Bros. Tool Co., Chicago.

PLANERS, STANDARD AND ROTARY

Betts Machine Co., Rochester, N.Y.
John Bertram & Sons Co., Dundas.
Canada Machinery Corp., Galt, Ont.
Can. Fairbanks-Morse Co., Montreal.
The Geo. F. Foss Mch. & Supply Co., Montreal.
Gardner, Robert, & Son, Montreal.
Garlock-Walker Machinery Co., Toronto, Ont.
Garvin Machine Co., New York.
Hamilton Machine Tool Co., Hamilton, Ohio.
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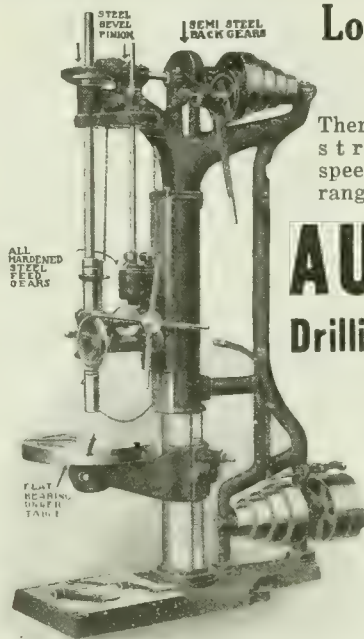
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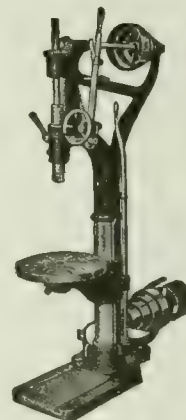
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A weekly newspaper devoted to the machinery and manufacturing interests.

Vol. XXI.

TORONTO, JANUARY 9, 1919.

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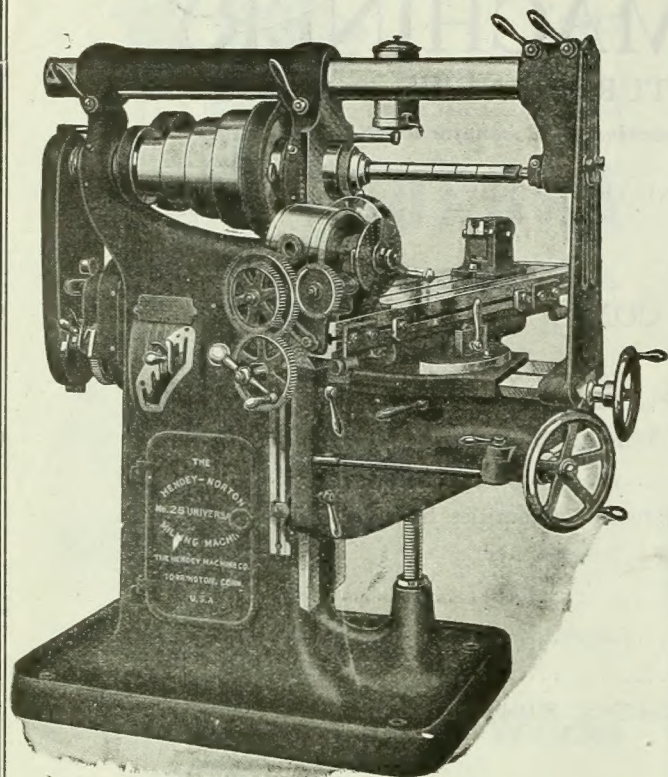
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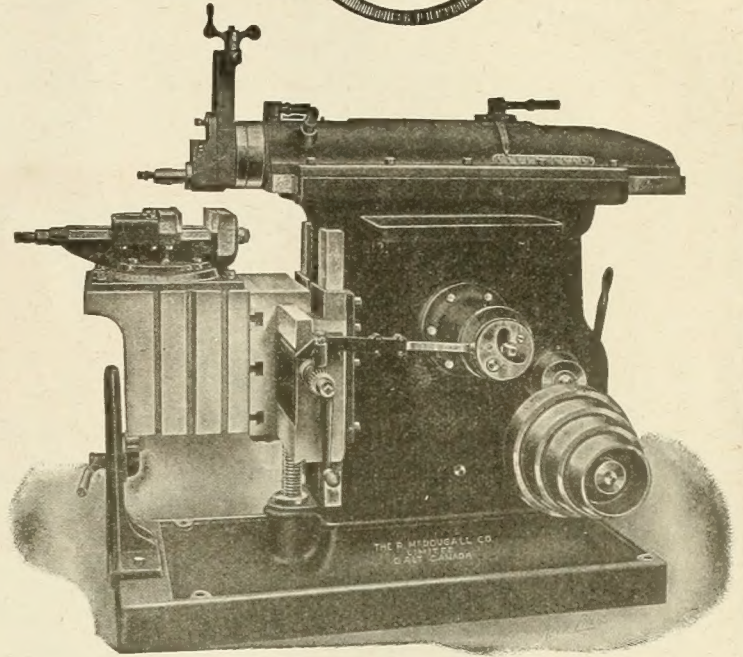
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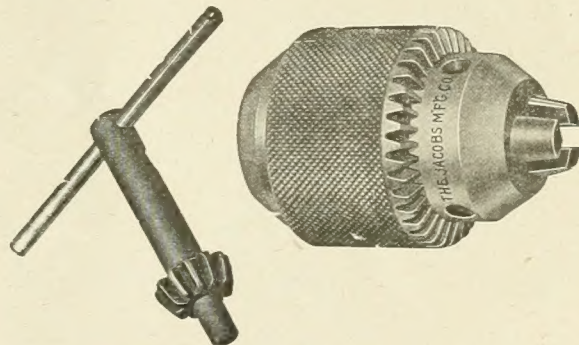
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